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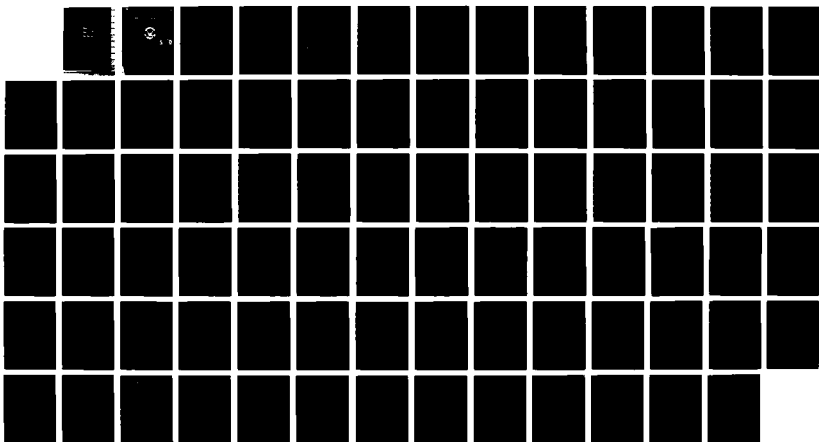
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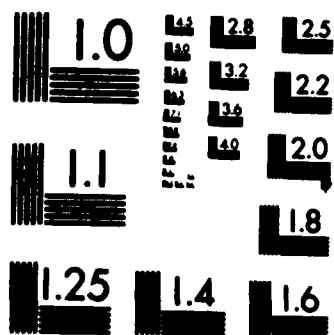
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THESIS

A STUDY OF THE U.S. COAST GUARD
STANDARD TERMINAL ACQUISITION PROCESS

by

James D. Maes

March 1987

Thesis Co-Advisor:
Thesis Co-Advisor:

Raymond W. Smith
Norman R. Lyons

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A Study of the
U.S. Coast Guard
Standard Terminal Acquisition Process

by

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Lieutenant, United States Coast Guard
B.S., U. S. Coast Guard Academy, 1980

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN INFORMATION SYSTEMS

from the

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March 1987

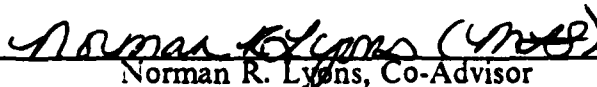
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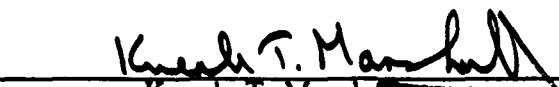
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Dean of Information and Policy Sciences

ABSTRACT

This thesis is a study of the regulations and directives that apply to the acquisition of Automated Data Processing systems for the United States Coast Guard. The original standard terminal acquisition for the Coast Guard in 1981 was intended to provide the Coast Guard with state of the art microcomputer capabilities. It was also an attempt at standardization to avoid a proliferation of noncompatible computer systems. A comparison of the original standard terminal acquisition process with the current applicable guidelines and regulations will provide a number of 'lessons learned' as well as a basic framework for similar acquisitions in the future.

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TABLE OF CONTENTS

I.	INTRODUCTION	8
A.	PURPOSE	8
B.	METHODOLOGY	8
C.	THESIS ORGANIZATION	9
II.	BACKGROUND	11
III.	BUDGETING	15
IV.	ACQUISITION FRAMEWORK	20
A.	ADP PLAN	20
B.	MAJOR SYSTEMS	21
C.	SECRETARIAL REVIEW	25
D.	PROCUREMENT AUTHORITY FOR ADP RESOURCES	26
E.	THE MODEL	27
1.	The Planning Phase	29
2.	The Approval Phase	31
3.	The Solicitation Phase	32
4.	The Evaluation Phase	33
5.	The Selection Phase	34
6.	The Implementation Phase	35
7.	Iterative System Evaluation Cycle	35
V.	THE ORIGINAL STANDARD TERMINAL ACQUISITION	37
A.	THE ACQUISITION	37
1.	The Planning Phase	37
2.	The Approval Phase	38
3.	The Solicitation Phase	39
4.	The Evaluation Phase	40
5.	The Selection Phase	42

6.	The Implementation Phase	43
7.	The Iterative System Evaluation Phase	43
B.	CONTRACT EXECUTION	45
VI.	CONCLUSIONS AND RECOMMENDATIONS	47
A.	SYSTEMS MANAGEMENT ENGINEERING FACILITY	47
B.	FUNDING	48
C.	EVALUATION TEAMS	49
D.	EXPERIENCE AND TRAINING	50
E.	PROJECT PERSONNEL CONTINUITY	51
F.	REGULATIONS	52
G.	STANDARDIZATION AND COMPATIBILITY	53
H.	PERIODIC SYSTEM AUDITS	54
I.	ACQUISITION DOCUMENTATION	54
J.	DEVELOPMENT TOOLS AND APPLICATIONS	55
K.	CHANGING COST OF TECHNOLOGY	57
L.	CONTRACT INTERPRETATIONS	58
APPENDIX A:	ACQUISITION PAPER	60
APPENDIX B:	MAJOR SYSTEMS CANDIDATE MEMO	63
APPENDIX C:	MISSION NEED STATEMENT	64
APPENDIX D:	PROGRAM MANAGER'S CHARTER OUTLINE	65
APPENDIX E:	QUARTERLY STATUS REPORTS	66
APPENDIX F:	STATUS CODE DEFINITIONS	68
APPENDIX G:	AGENCY PROCUREMENT REQUEST	69
APPENDIX H:	DETERMINATION OF NEED AND REQUIREMENTS ANALYSIS	71
APPENDIX I:	COMPATIBILITY LIMITED REQUIREMENTS	72
APPENDIX J:	SELECTION PLAN	73

APPENDIX K: REQUEST FOR PROPOSAL	74
LIST OF REFERENCES	75
BIBLIOGRAPHY	77
INITIAL DISTRIBUTION LIST	79

LIST OF FIGURES

2.1	Information Resources Management Architecture	14
3.1	Coast Guard Long Range Planning	18
3.2	Budget Process for C3/IRM	19
4.1	Comparison of the Proposed Model with the A-109 Process	28
5.1	Standard Terminal Planning and Approval Phases	40
5.2	Standard Terminal Solicitation Phase	41
5.3	Standard Terminal Evaluation and Selection Phases	44

I. INTRODUCTION

A. PURPOSE

In 1981 the Coast Guard contracted for a service-wide standard microcomputer capability and its support. That contract is about to expire. In the interest of continuing to provide the Coast Guard with the microcomputer capabilities and support which have become an integral part of Coast Guard operations and support, procurement of hardware, software, maintenance, training and other support services must be completed prior to the expiration of the current contract. The following excerpt from a Coast Guard policy document describes the need for this thesis:

The original standard terminal contract was extremely difficult to manage for the first year and a half, mostly due to the Coast Guard's inexperience with an ADP procurement that reached so deeply into the organization. This was the first time ADP capability was made available to the majority of the Coast Guard, and the contract provisions were not adequate to ensure sufficient support to the user. To avoid similar problems in the administration of the follow-on contract, the project staff shall place a heavy emphasis on seeking lessons learned in the past, and incorporating them into the strategy of the new procurement. Experts in many functional areas must be involved such as G-FCP (Office of Comptroller, Procurement Division), G-FQA (Office of Comptroller, Quality Assurance Division), G-PTE (Office of Personnel, Training and Education Division), G-TDS (Office of Command, Control and Communications, Data Systems Division), G-TES (Office of Command, Control and Communications, Electronics Division), SMEF (Systems Management and Engineering Facility), and all Operating and Support Program Managers. In addition, involvement of persons with first hand knowledge of the problems in the original contract would help to avoid the same problems the second time around. [Ref. 1: p. STMP-20]

This thesis will attempt to satisfy the lessons learned requirement from the Data Systems Division (G-TDS) Project Officer's point of view. Finally, the policy statement quoted above is stated in a very negative way. It suggests that the earlier problems should be avoided. However, it makes no mention of the strengths and positive points of the original acquisition. In the conclusions portion of this thesis, the strengths to be emphasized as well as the problems to be avoided will be discussed.

B. METHODOLOGY

An extensive literature search of applicable Department of Transportation, Coast Guard, General Services Administration, and Office of Management and Budget regulations, orders and directives was performed to determine the acquisition process prescribed for ADP resources. To provide insight into the original standard terminal

acquisition process, interviews and questionnaires were used to obtain information from the participants in that project. Questionnaires from other studies on the standard terminal were also used. The members involved with the current project for recompetition of the Coast Guard standard terminal provided an extraordinary amount of knowledge of and insight into the acquisition process. Although a significant amount of the original life cycle documentation for the first project was not located in the acquisition file, the interviews have provided substantial information toward filling documentation gaps.

Comparison of the original standard terminal acquisition with the current regulations may seem like an unfair and meaningless evaluation. However, this thesis was prepared in that very manner for several reasons. First, obtaining the applicable regulations as they existed at the time of the original acquisition would be a significant if not impossible research task. Next, microcomputers were a relatively new technology bursting onto the scene at that time, and their impact was not completely evaluated or anticipated by those organizations that mandate regulations and establish procedures. Some of the directives and regulations did not even exist at the time of the original acquisition. Finally, the intent of this thesis is to provide a constructive 'lessons learned' type of evaluation approach, to avoid the pitfalls and emphasize the strengths of our past efforts. This thesis will provide an acquisition model upon which acquisition planners and managers can use to base similar acquisitions.

Following the current applicable rules and regulations while avoiding the problems of the past should be a major goal for any type of acquisition undertaken by the Coast Guard.

C. THESIS ORGANIZATION

- CHAPTER I. Introduction - A description of the thesis.
- CHAPTER II. Background - The reasons behind the acquisition of the Coast Guard Standard Terminal.
- CHAPTER III. Budgeting - A tip of the iceberg introduction to the Coast Guard planning, programming and budgeting system for command, control and communications/information resources management (C3/IRM).
- CHAPTER IV. Acquisition Framework - The significant elements that comprise the acquisition process for ADP resources are each briefly described in the early sections of this chapter. Developing an acquisition model by putting these elements together is the purpose of the final section.
- CHAPTER V. Acquisition - The actual acquisition process used by the Coast Guard for the standard terminal.
- CHAPTER VI. Conclusions and Recommendations - Brief discussions of significant points considered as a result of research into the standard terminal acquisition process.

- **APPENDICES** - Enclosures taken from numerous government sources on the contents and preparation of acquisition documentation and reports.
- **LIST OF REFERENCES** - A sequential list of sources cited or paraphrased in the body of the thesis.
- **BIBLIOGRAPHY** - Selected sources which proved helpful in the research process.

II. BACKGROUND

During the late 1970's the Coast Guard began developing what was later to become the U.S. Coast Guard Information Resources Management Architecture. The plan was based on the following goals [Ref. 2: p. 2-2]:

- **Intelligent Terminals** to provide a vehicle for local processing, original data entry, and access to the network(s)
- **The Communications Network** to provide connectivity
- **Data Base Technology** to control the data resource
- **Integration** of the parts into a whole. The parts are:
 - a. Plans
 - b. Budgetary Action
 - c. Human resources (including training)
 - d. Applications software to perform specific tasks
 - e. Standard software packages to provide common user capabilities and interfaces
 - f. Support facilities such as Coast Guard laboratories and Supply Center to provide unique services such as hardware and software support.

The standard terminal became the intelligent terminal, one of the building blocks, upon which the architecture plan is based. A contract for communications network services was let during FY80, one year before the standard terminal contract. A 5 year service contract with GTE Telenet provided the telecommunications medium along with other Government networks. The standard terminal hardware and software provided the local networking capability.

Data base technology, another major part of the plan, refers to the concept that every user does not require that his/her data be stored and/or maintained locally. Rather, the data may be available at another source where it is entered or maintained. Ideally, the technology and methods to access that data would be transparent to the user. Providing access to data in central databases allows a practical and economical means to insure data integrity. Every user does not require a separate copy of the database or the resources (time, personnel, machine, money) to maintain current and accurate data. The goal that data need only be entered once and eventually maintained by a single activity, benefits the Coast Guard as a whole. The Joint Uniform Military Pay System (JUMPS) is a prime example. JUMPS has a central

database where pay data is stored and maintained on Coast Guard members. References to pay are all done through the central database.

The basic goal of the IRM architecture is to promote resource sharing. Figure 2.1, reproduced from Commandant Instruction M3090.1, is a diagram depicting the IRM architecture. It shows the capabilities and methods available to the Coast Guard for information transfer and access.

Clusters of standard terminals are spread throughout the architecture as end user's tools. They are represented as terminals in the diagram.

The information centers at Coast Guard Headquarters and District offices are tasked with carrying out support functions for users. The support includes recommending use of the proper hardware and software, enforcing standards, and dealing with common user problems and requests, to name a few.

The networks displayed on the diagram are the primary method of data transfer utilized by the Coast Guard. AUTODIN, DDN (Defense Digital Network) and NADIN (Federal Aviation Administration's National Airspace Data Interchange Network) are Government networks. Public networks include FTS, the public switched network (telephones), and the value added network of GTE Telenet. Coast Guard leased lines are dedicated data lines still used in some applications. The polled network is used for low to medium speed store and forward communications. Store and forward communications are most common in the message traffic system, where messages may be sent from unit to unit.

A prime example of a system complying with the IRM architecture is the Marine Safety Information System (MSIS). It is depicted on the architecture diagram. MSIS is one of the major applications that drove the standard terminal requirements in its early planning stages. It is a system built around an extensive base of information about commercial vessels and marine safety. It provides licensing, inspection and documentation information nationwide. Standard terminals connect Headquarters, District offices, Marine Safety Offices (MSO), Captain of the Port offices (COTP), Marine Inspection Offices (MIO) and Marine Safety Detachments (MSD) to the MSIS host via networks. Other major applications such as JUMPS (Joint Uniform Military Pay System) and PMIS (Personnel Management Information System), for example, exist and utilize the IRM architecture in the same manner as MSIS.

Coast Guard units include airstations, MSO's, groups, coastal search and rescue stations, communications centers, cutters and aircraft. Clusters of standard terminals

are typically found at most units. Clusters allow interconnection of offices and divisions at those units.

A major goal of the Coast Guard C3/IRM is to maintain horizontal and vertical compatibility of its IRM resources. Horizontal compatibility means the ability of information to be used from station to station, from unit to unit. Vertical compatibility is being able to pass information from smaller subordinate units to larger higher level units. The reverse is also desired.

The standard terminal was originally intended to be a Coast Guard wide standard data entry terminal. ADP capability was centralized in large facilities at that time. Use of a single, easily recognizable, piece of hardware would reduce the training and familiarization time necessary for personnel using those ADP facilities.

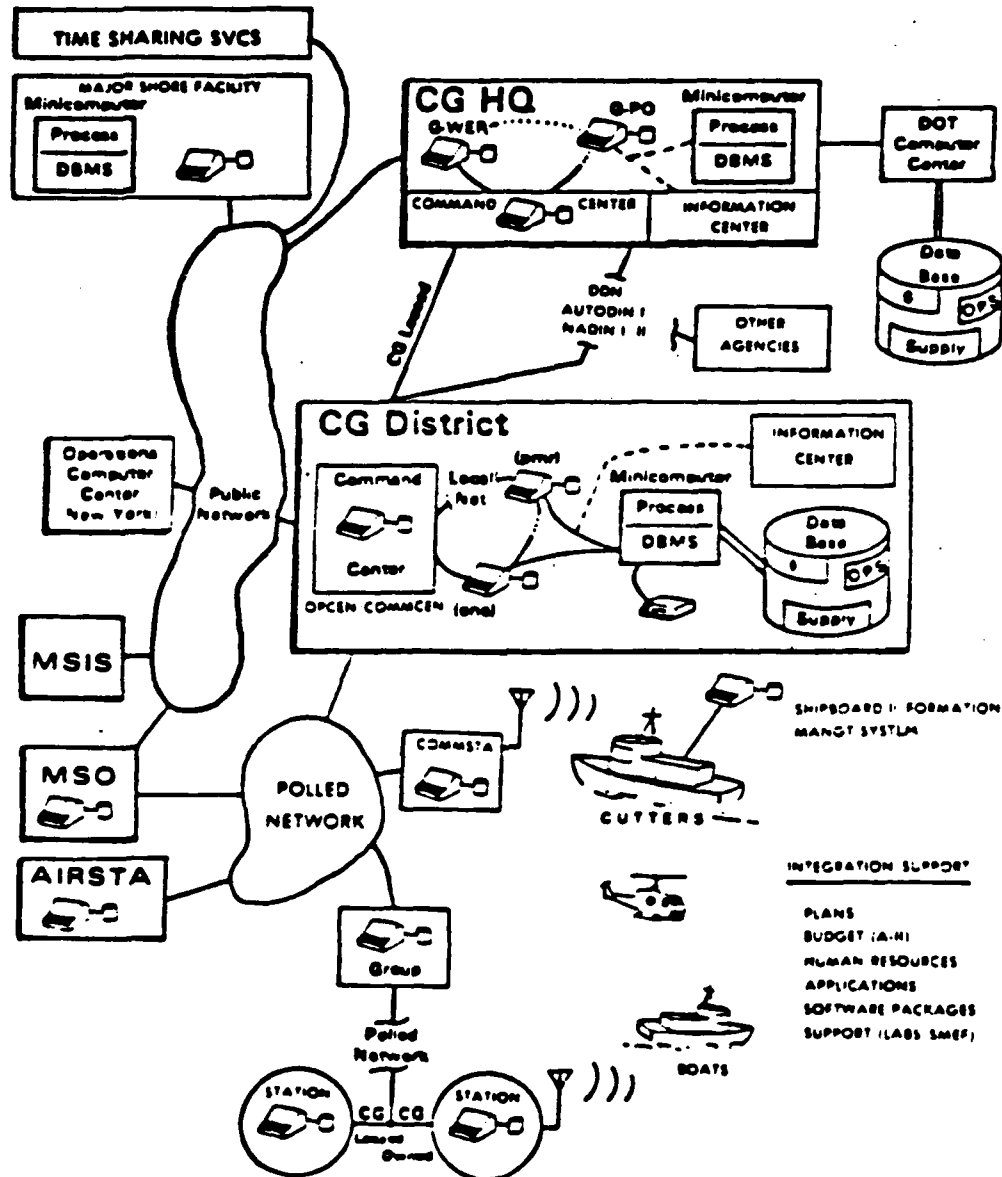
If all access equipment is configured with standard modules, if the method of discoursing with the computer is the same, and if the method of computer data display is common throughout all computer facilities and applications, then the problem of multiple ADP facilities and vendors does not affect the user. If the user sees a consistent access scheme on a computer terminal display screen, and discusses and enters data to all computers in a consistent format, he or she need not be concerned about the make, model, or location of the computer being accessed. [Ref. 3: Sec. F.1.2.2]

The standard terminal was developed into a high capability microcomputer with the ability to satisfy most of the Coast Guard's needs at that point in time and well into the future.

Office automation was not a buzz word during the late 1970's when the requirements for the standard terminal were developed. The Coast Guard built office automation capabilities into its contract when it decided that local word processing, telecommunications, and local networking should be requirements for its systems. Local networking (clustering) gives several workstations in a relatively close area the ability to share peripheral devices and, most importantly, share data. Telecommunications allow remote data entry and data transfer between clusters, and from workstations to larger ADP facilities.

Applications development software such as Pascal, Cobol and Fortran were included on the specification. Others, such as database capabilities, for local data entry and manipulation were also required. Each site had a standard set of software delivered with its hardware.

U.S. Coast Guard Information Resources Management Architecture



[Ref. 2: p. 2-4]

Figure 2.1 Information Resources Management Architecture.

III. BUDGETING

Budgeting for any large project is a process that must begin well in advance of the time that funds will actually be obligated for that project. This chapter will provide an overview of the planning, programming and budgeting system the Coast Guard's Office of Command, Control, and Communications (G-T) uses for information resources management (IRM) resources.

The Commandant has responsibility for an approved Coast Guard program. The Chief of Staff at headquarters coordinates the activities of program directors, who rely on program managers, to develop the various programs that support the basic objectives of the Coast Guard [Ref. 4: p. 1-2]:

- To minimize loss of life, personal injury, and property damage on, over, and under the high seas and waters subject to U.S. jurisdiction.
- To facilitate waterborne activities in support of national economic, scientific, defense and social needs.
- To maintain an effective, ready, armed force prepared for and immediately responsive to specific tasks in time or war or emergency.
- To assure the safety and security of vessels and of ports and waterways and their related facilities.
- To enforce federal laws and international agreements on and under waters subject to the jurisdiction of the United States and on and under the high seas where authorized.
- To maintain or improve the quality of the marine environment.
- To cooperate with other governmental agencies and entities (federal, state and local) to assure efficient utilization of public resources and to carry out activities in the international sphere where appropriate in furthering national policy.

General policy guidance is provided for the next 25 years by the Commandant's Long Range View. Future Coast Guard missions and activities are anticipated through the forecasts provided in the document. Headquarters and field level planning are all based upon the Commandant's forecasts. The Long Range View, however, is not a plan, it is a policy statement.

Requirements from which the Coast Guard develops its budget come from many sources. Figure 3.1 illustrates the inputs to the planning database.

Operating program plans and support program plans are extracted from the Commandant's Long Range View. With this extraction, planning is brought down to a more manageable time frame of 5 years. Operating program plans (OPP) and support

program plans (SPP) are developed by operating and support program managers. Operating program managers are those officers overseeing programs such as search and rescue (SAR) and enforcement of laws and treaties (ELT) which make up the various missions that the Coast Guard performs. Support programs are those programs that support the missions of the Coast Guard, such as telecommunications and engineering.

It is at the program director/manager levels that policy is converted into plans, programs and budgets. Command, control and communications is one of the Coast Guard support programs. As mentioned earlier, a five year support program plan (SPP) is used to translate formal Coast Guard objectives into programs. The program director for this support program is the Chief, Office of Command, Control and Communications (G-T). His deputy office chief (G-Td) is the program manager for command, control and communications programs.

District Commanders and Commanding Officers of headquarters units also take the Commandant's forecasts and translate them into planning proposals (PP), development plans (DP). Letters with recommendations and suggestions may also be used to provide input to the requirements database. Planning proposals are the initial input for submitting a field originated project into the planning, programming and budget system. Approval of a planning proposal shows that the project is of significant importance to proceed to the resource change proposal (RCP) phase. RCP's are budget requests. They will be discussed later in this section.

Requirements for information resources management resources are described in terms of functions, processes, activities, information requirements, and entities which define the anticipated system. ADP systems should also be submitted to the Coast Guard ADP Plan, which is input to the ADP obligation ceilings set for the various agencies of the federal government by the Office of Management and Budget.

Coast Guard requirements come from several other sources. The Departments of Defense and Transportation may provide suggestions or direction to the Coast Guard. Research and technology from outside the Coast Guard are external sources of input.

Figure 3.2 graphically shows the process which is followed to develop C3/IRM requirements into approved budget items.

C3/IRM requirements from the planning database are forwarded to the Office of Command, Control, and Communications, Planning and Policy Division (G-TPP). The Coast Guard C3/IRM Plan is developed from that data. The C3/IRM Plan addresses the applicable requirements which may have come from shorter time frame support

plans. Coast Guard goals and strategies for command, control and communications/information resources management for the next 20 years are outlined in the C3/IRM Plan.

The direction in the C3/IRM Plan provides input to the Coast Guard ADP Plan and is the source of the C3 Support Plan (GAT SPP) which describes the proposed ADP and telecommunications systems for the next 5 year time frame. Systems requiring research and development effort are input to the R&D Support Program Plan (GRD SPP). Others are passed to the C3 requirements document which provides detailed schedules for replacement and acquisitions of new capital resources.

Budget requests are submitted in the form of resource change proposals (RCP). Besides cost estimates the RCP includes information on personnel resources which will be required, expected benefits and impact on other programs. Three different funding types are: (1) operating expenses (OE) are the funds with which the Coast Guard carries out its activities during the budget year; (2) acquisition, construction, and improvement (AC&I), multiyear funding for large projects and capital investments; and (3) research, development, test and evaluation (RDT&E), research and development projects. Some requirements will automatically have RCP's approved. Others, however, will require determinations, prioritized justifications, be prepared by the responsible program manager. The Commandant later decides which of these become RCP's. Approved RCP's are then used to formulate the Coast Guard budget.

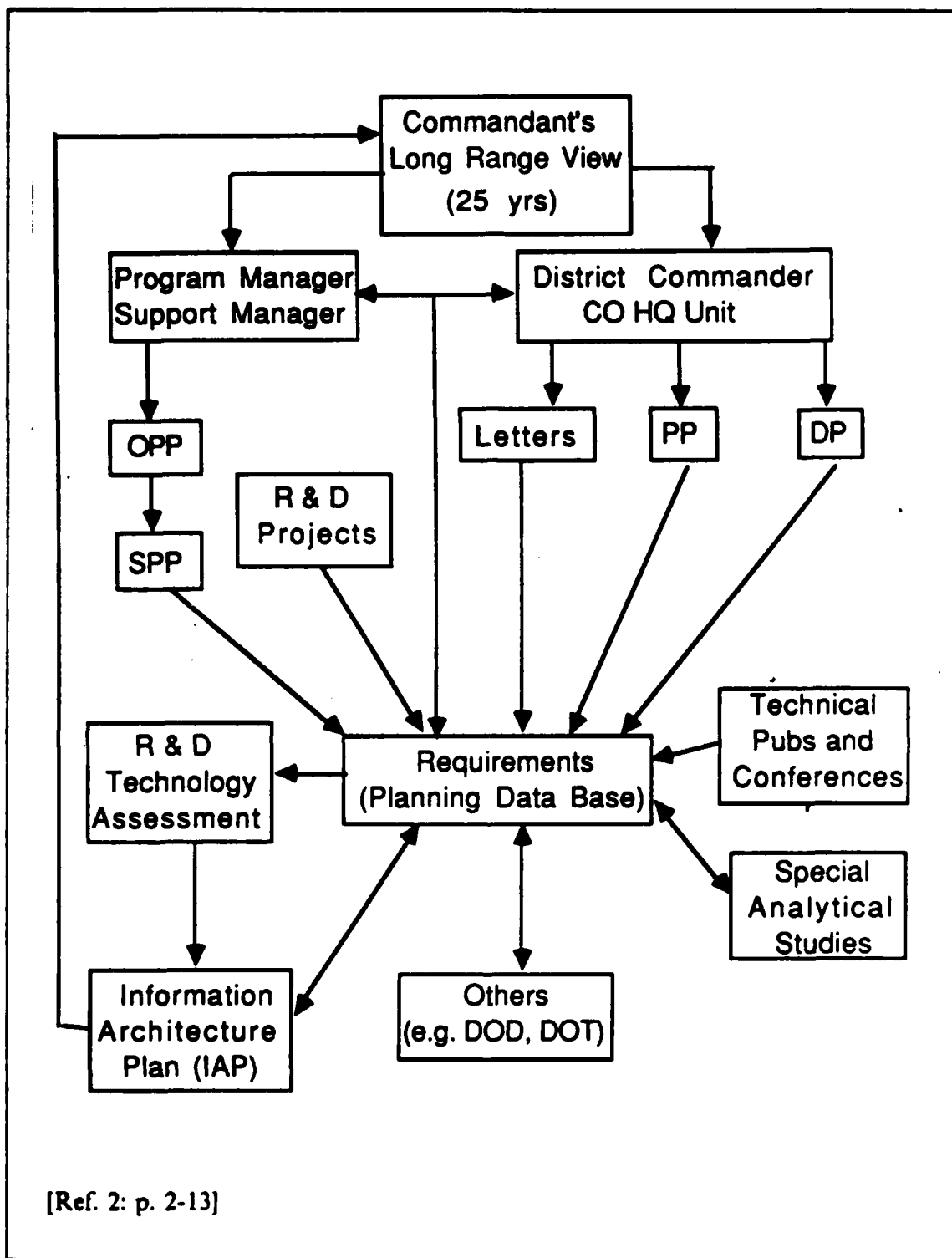


Figure 3.1 Coast Guard Long Range Planning.

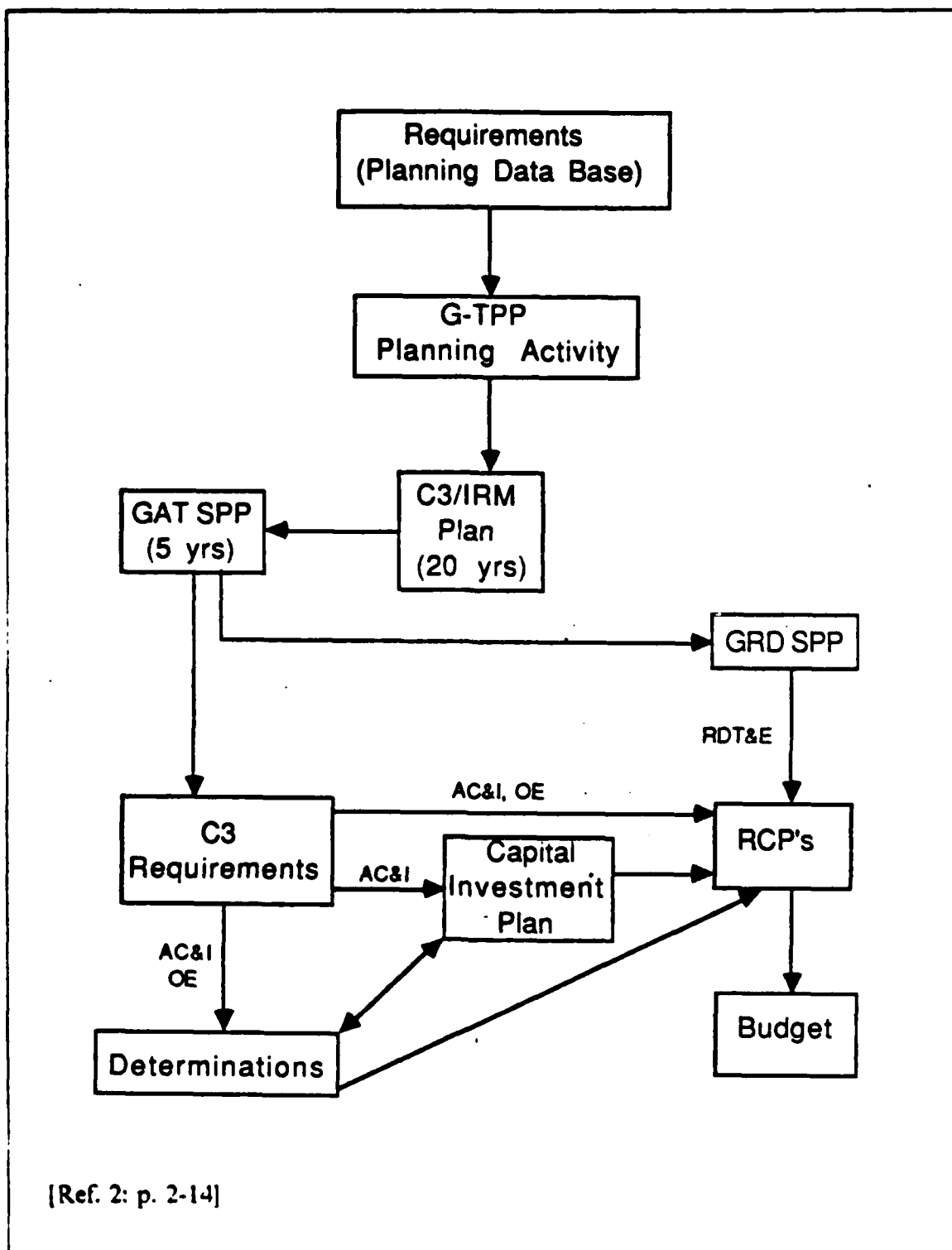


Figure 3.2 Budget Process for C3 IRM.

IV. ACQUISITION FRAMEWORK

This chapter describes several of the most important topics concerning large ADP acquisitions. They are the ADP Plan, the Department of Transportation's implementation of the Office of Management and Budget's A-109 acquisition process for major systems, the secretarial review process for acquisitions of significant interest to DOT, and the procurement authority for ADP resources. Although it is improbable that a Coast Guard ADP acquisition would meet the life cycle cost or R&D cost criteria of a major system, a discussion of the A-109 process is important. A secretarial review designation may require the acquisition be done following a scaled down A-109 process.

Following a brief presentation of the topics mentioned above, an acquisition model is proposed. The model is to be used by the team involved with overseeing the acquisition. Those involved with particular projects along the way will be concerned with their process in much greater detail, therefore the overall acquisition model will not be of particular benefit to them. However, everyone involved with the acquisition should be aware of the major project milestones and how those milestones can be affected by their progress and efforts.

A. ADP PLAN

Planning for ADP resources in the Coast Guard is accomplished by reporting ADP systems and proposals in the Coast Guard ADP Plan. The ADP Plan provides a near to mid term planning horizon as to where the Coast Guard should or will be in terms of ADP systems and capabilities in the next 5-10 years. Reporting of all ADP requirements is mandatory, regardless of the system cost. Larger systems that are being developed will be reported in the ADP Plan over a number of years, beginning with its concept formulation, continuing through its implementation. Submissions to the ADP Plan must be made to Commandant (G-TPP) by 1 May of each year. Commandant Instruction M5230.8(series) is the Coast Guard ADP Plan.

Funding information for all systems and proposals is included in the ADP Plan. Summary budget data is compiled for all operating agencies by the Department of Transportation into the DOT ADP Plan, which satisfies DOT's planning requirements for ADP as well as reporting requirements specified by the Office of Management and

Budget (OMB). OMB takes the data from the DOT ADP Plan and sets an ADP Obligation Ceiling for the Department of Transportation. DOT, in turn, sets an ADP Obligation Ceiling for the Coast Guard, which in turn sets unit ceilings for units reporting in the Coast Guard ADP Plan. Units submitting input to the ADP Plan must identify the source of funds for their projects. RCP's for AC&I, OE and RDT&E funds are submitted by operating and support program managers for larger ADP systems.

System proposals reported in the ADP Plan are not necessarily approved simply by their appearance in the plan. Projects with estimated life cycle costs in excess of \$50,000 require the approval of Commandant (G-T). In cases where life cycle costs are expected to exceed the Coast Guard's blanket delegation of procurement authority of \$50,000 for ADP resources, DOT approval must be sought. The recommended method to request approval of a system is to submit a request for advance approval with the annual ADP Plan submission. The advance approval request should appear in the ADP Plan one year before approval is necessary to allow for DOT review. Systems not using the advance approval process should expect delays in receiving DOT approval. Those systems not appearing in the ADP Plan with acquisition life cycle costs in excess of \$50,000 will require DOT approval, but will only be considered on a case by case, time available basis. Consolidation of all proposed systems and requests for approval provides the reviewing authorities with an overall picture of where the Coast Guard is going with ADP and information systems.

B. MAJOR SYSTEMS

OMB Circular No. A-109, Major System Acquisition, specifies the procedures to be followed during the acquisition process of systems designated as major. Agencies of the federal government are mandated to implement the A-109 process for their major acquisitions. However, each agency is allowed to determine the criteria of systems that do or do not qualify as major systems. Major systems acquisition programs are those programs that (1) are directed at, and are critical to, fulfilling a Departmental mission, (2) entail the allocation of relatively large resources, or (3) warrant special management attention [Ref. 5: p. 2]. The Department of Transportation's (DOT) major systems criteria are:

- Total system acquisition cost exceeds \$150,000,000; or
- Research and development costs in excess of \$25,000,000; or
- DOT secretarial review designates the system as a major system.

Acquisition costs are those costs incurred over the life of the system starting with the concept formulation up to and including implementation. Acquisition costs do not include system maintenance costs.

Input for budget planning for new and ongoing acquisitions which meet the above dollar criteria for major systems is submitted to the Department of Transportation, Assistant Secretary for Budget and Programs by the first of May each year. For proposed systems, a memorandum on the major systems candidate, Appendix B, and a mission need statement (MNS), Appendix C, are required inputs. The memorandum on the major systems candidate is basically a one page condensation of the mission need statement. However, it also includes a recommendation as to whether or not the project should be designated a major system.

The major systems acquisition process is broken down into a series of more manageable subprocesses separated by decision points. They are called Key Decisions in the Department of Transportation's implementation of Circular No. A-109's procedures, described in DOT Orders 4200.14(series) and 4200.9(series). The Deputy Secretary of Transportation retains the approval authority at each Key Decision point unless specifically delegated. Recommendations at each Key Decision are provided to the Deputy Secretary from the Transportation Systems Acquisition Review Council (TSARC). The membership of the TSARC is:

- Deputy Secretary (S-2), chairman
- Assistant Secretary for Policy and International Affairs (P-1)
- Assistant Secretary for Budget and Programs (B-1)
- Assistant Secretary for Governmental Affairs (I-1)
- Assistant Secretary for Administration (M-1)
- Assistant Secretary for Public Affairs (A-1)
- General Counsel (C-1)
- Director, Office of Installations and Logistics (M-60), TSARC Executive Secretary.

Missions are those responsibilities mandated or delegated to an agency for satisfying a national need. The mission need statement describes a mission deficiency or opportunity to more effectively or efficiently perform mission responsibilities. It is important to recognize that the MNS is not intended to propose a solution, but merely to document a perceived need. Format for the MNS is provided in Appendix C.

OMB Circular No. A-109 requires a continuing analysis of current and forecasted mission capabilities, technological opportunities, overall priorities and resources that are involved. When the analysis identifies a deficiency in existing agency capabilities or an opportunity to establish new capabilities in response to a technologically feasible opportunity, this will formally be set forth in a mission need statement. [Ref. 6: p. 8]

The original standard terminal acquisition was an opportunity for the Coast Guard to establish new capabilities for both operations and support because of a relatively new technology, microcomputers. It was so new, the Coast Guard and the Department of Transportation were not quite sure how to proceed with the acquisition.

Budget estimates included in the mission need statement determine how DOT will choose to manage the acquisition. The secretarial review process will be discussed in a later section.

Approval of a mission need statement by the Deputy Secretary is a prerequisite to proceed further with the project. Following approval of the mission need statement (MNS) a project officer (PO) should be designated as soon as possible. The project officer should draw up a charter, basically a contract between the PO and his/her superiors outlining the job description, responsibilities, and authority. The charter is approved by the Chief of Staff (G-CCS). The project officer reports directly to the program director. For ADP acquisitions the project officer reports to the Chief, Office of Command, Control and Communications (G-T). The responsibilities of a project officer include [Ref. 4: p. 16-3]:

- Ensuring the project is responsive to mission needs, as stated in the mission needs statement (MNS)
- Develop project objectives
- Establishing project schedules
- Providing necessary budget documentation
- Preparing and updating the acquisition paper (AP) and other documentation, and
- Executing approved AP milestone schedules.

Depending upon the size of the project the project officer's job may become very complex and demanding. In general the project officer should be chosen based upon background and experience in the field. OMB Circular No. A-109 refers to the managers of major acquisitions as program managers. The A-109 program manager is not to be confused with the Coast Guard's program manager. A program manager in the Coast Guard refers to support or operating program managers who oversee the

various Coast Guard missions and support programs for those missions. A project officer in the Coast Guard acquisition process is the equivalent of the A-109 program manager.

Next, the acquisition paper (AP) is prepared. The acquisition paper is the key justification and documentation of a system as it progresses through the acquisition process. The acquisition paper contains, among other things, the acquisition strategy and estimated costs, a projected schedule and milestones, notable studies such as economic analysis and feasibility studies, and recommendations to proceed through the current Key Decision point. See Appendix A for the format of an AP. The Federal Acquisition Regulations require that an acquisition plan be prepared early in the acquisition process to promote full and open competition [Ref. 7: Sec. 1.7.103]. The acquisition paper satisfies the acquisition plan requirement.

Key Decision 1, the authorization to proceed with the exploration of alternative system design concepts, occurs when the acquisition paper is approved for the first time by the Deputy Secretary. This is the nod to proceed with documenting the functional requirements of the proposed system. Input should be solicited from all possible beneficiaries of the system.

Advancement to the competitive test and demonstration phase of the acquisition occurs upon the approval of the updated acquisition paper, Key Decision 2. The updated AP should contain updates on the system acquisition costs, updated goals and schedule, significant changes and status reports on program activities. In this phase, contractor proposed systems, based upon the functional and technical specification requirements, are evaluated on paper for economic comparison and technical compliance. An operational capabilities demonstration (OCD) is also required to demonstrate their compliance.

Upon completion of the test and demonstration phase the AP is once again updated. The test results and cost evaluations from this phase will be included in the AP update. Again status reports and other updates support the recommendation to proceed in the AP. Key Decision 3, commitment of a system to full scale development and limited production, occurs upon approval of the AP. Selection of the system that most economically and efficiently meets the needs and specifications happens during this phase.

Key Decision 4, commitment of a system to full production, occurs upon the approval of the updated AP. At this point the selected system is procured and

distributed to field units as necessary to meet the documented needs of the operating agency.

As the acquisition process progresses, quarterly reports must be submitted to the TSARC for review. The quarterly status reports shall assess cost, schedule and technical performance experience against predictions [Ref. 5: p. 9], and include observations and recommendations as to how the variance may affect the life cycle cost. Appendices E and F provide the sample format and status codes required for the quarterly status reports.

C. SECRETARIAL REVIEW

The secretarial review process applies to proposed systems that fall below the dollar requirements for major systems, but have: (1) total acquisition costs greater than \$20,000,000; or (2) anticipated 3 year research and development costs that exceed \$5,000,000 [Ref. 8: p. 1].

A one page memorandum similar to the memorandum for major systems candidates is submitted by 1 May of each year to the Assistant Secretary for Budget and Programs. This memorandum contains a brief recommendation and reasoning concerning the applicability of TSARC review and involvement in the acquisition. The Assistant Secretary for Budget and Programs prepares recommendations, based on input from other secretarial offices, and submits them to the Deputy Secretary. As soon as possible the Deputy Secretary makes a determination on each system and places them in one of the following categories:

- MSA - Major Systems Acquisition
- TPL - TSARC Program List
- NBR - Normal Budget Review.

A major systems designation of one of these lower cost acquisitions signifies the importance of or Secretarial interest in the particular project. The procedures discussed earlier for major systems acquisition must be followed.

Systems included in the TSARC program list basically follow the same process as major systems. In fact it is a scaled version of the A-109 process with the Key Decisions delegated to lower organizational levels. An acquisition paper must be submitted and approved by the Deputy Secretary. quarterly status reports are also required. However, the decision authority at the Key Decision points is delegated to the head of the responsible DOT agency, unless specifically withheld by the Deputy

Secretary upon approval of the AP. The Commandant is the Decision Authority for the Coast Guard. The Deputy Secretary should receive an updated acquisition paper for review and approval only if the acquisition exceeds any limitations imposed by him or if it deviates significantly from cost and/or schedule baselines. Under these conditions the Deputy Secretary's acquisition approval is necessary before the acquisition proceeds further.

Programs not specifically categorized as MSA or TPL fall into the normal budget review category. These systems will be considered in the budget review process for funding and approval. It should be noted that approval of an acquisition paper and designation of an acquisition as a major system or TSARC Program List does not guarantee funding in the budget process. The approved acquisition paper is used as background support information and justification of a project in the RCP submitted during the budget development process.

D. PROCUREMENT AUTHORITY FOR ADP RESOURCES

The General Services Administration (GSA) has exclusive procurement authority for the federal government for ADP resources under 40 USC 759 [Ref. 9: Sec. 201-23.100]. Procurement authority may be delegated to agencies of the federal government by GSA. Delegation of procurement authority (DPA) allows agencies to proceed with a particular ADP acquisition without further involvement from GSA. A blanket delegation of procurement authority has been granted to all agencies, which includes the Department of Transportation. For procurements made through competitive solicitation procedures¹ the following DPA is granted to executive agencies:

- ADP equipment purchases not to exceed \$2,500,000
- ADP equipment rental charges including maintenance not to exceed \$1,000,000 annually
- Software acquisition not to exceed \$1,000,000
- Maintenance services not to exceed \$1,000,000 annually.

Agency DPA's can be further delegated to its organizational components. The Department of Transportation's delegation of procurement authority to the Coast Guard is \$50,000 for ADP equipment which does not appear in the DOT ADP Plan, and a maximum of \$300,000 for approved systems which appear in the DOT ADP Plan

¹To satisfy full and open competition required by the Competition in Contracting Act of 1984.

[Ref. 10: p. 9]. The DOT ADP Plan is a planning and budgeting document for ADP resources in the Department of Transportation. It was discussed in an earlier section of this thesis.

Acquisitions of ADP resources by the Coast Guard which exceed its procurement authority delegated by the Department of Transportation must be presented to the Assistant Secretary for Administration (M-1) for approval. For ADP systems with acquisition costs which are expected to exceed DOT's blanket DPA, an agency procurement request (APR) must be submitted to the General Services Administration through the Department of Transportation. Coordination with GSA prior to submitting the APR is encouraged. Identification of problem areas early in the process may eliminate possible delays in approving the APR and the granting of the delegation of procurement authority for that particular acquisition [Ref. 9: Sec. 201-23.106]. DOT recommends use of the alternative APR submission, the description and format of which is shown in Appendix G. Two copies of the APR should be submitted to GSA. GSA will review the request and take action within 20 days of receipt of the necessary information. After 20 days, plus 5 days for mail delay, if no word has been received from GSA the agency may act as if the DPA has been granted and proceed with the acquisition process. The 20 day deadline is set by GSA when it responds in writing stating that the necessary information has been received. The commencement date of the 20 day review period will be in the notification. No solicitation or contracting activity may begin until the DPA has been granted.

E. THE MODEL

Now that some background has been provided for some of the most important mandated elements concerning acquisition of ADP resources, a model will be developed that incorporates everything up to this point.

The Key Decision points discussed in the Major Systems Acquisition section remain the important milestones in any acquisition process which meet or exceed the criteria for secretarial review. However, for the purpose of an acquisition of off-the-shelf ADP resources, Key Decision 2 and 3 are usually combined into one decision [Ref. 6: p. 24] to streamline the process. It is sometimes referred to as customizing the acquisition. The proposed ADP acquisition model is based on redefining the phases between each Key Decision with a single broad term that describes the activities that occur during that phase. Figure 4.1 illustrates the basic model.

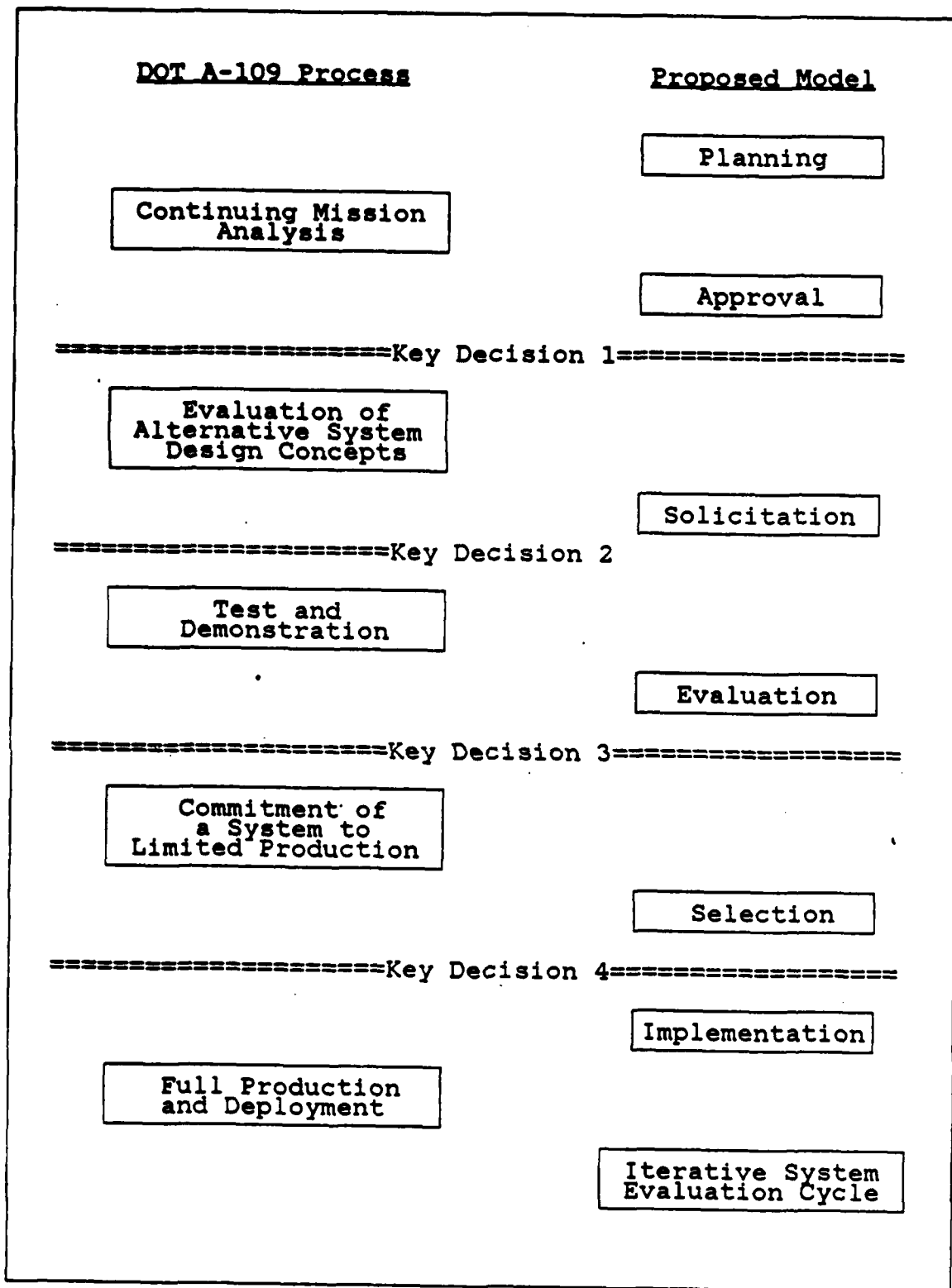


Figure 4.1 Comparison of the Proposed Model with the A-109 Process.

Each phase in the life cycle should be concrete and identifiable. Separation milestones between phases are major decision points. Transition is accomplished by satisfactory completion of predetermined milestones. This does not mean that requirements and determinations from an earlier phase cannot be reconsidered and possibly modified later. Problems are cheaper and easier to work out in the earlier phases than in the later ones. For example, requirements considerations should be handled early in the process while the analysis oriented personnel are working on the project. A contracting officer should not be left to make determinations on the functionality of hardware merely because a portion of the requirements analysis was overlooked. On the other hand, deleting an unnecessary requirement or adding a new critical function should not be ignored simply because that stage of the project has passed. A system that is obsolete or useless when it is finally acquired has failed somewhere along the acquisition process.

It is very important not to proceed ahead in the project cycle before the authorization to proceed has been granted. This avoids wasted time, effort and money. All the necessary details possible should be considered and planned before proceeding.

Documentation is also necessary. It may be used to prove regulatory compliance. More importantly, the thought process and reasoning which drove the project may prove invaluable at a later point in time.

1. The Planning Phase

The planning phase of this acquisition model begins with the conception of an idea to develop or acquire an ADP system. For the purposes of this thesis, consideration will be limited to multipurpose hardware and software. The development or replacement of an ADP system may be considered for many reasons. Among the possibilities; obsolescence of an existing system, new requirements mandated by mission or law, new technological opportunity, or simply, a suggestion to improve performance and capabilities in any of the many things the Coast Guard does. Regardless of the origination of the idea, all systems must proceed through the same planning steps to be able to proceed on to the approval phase.

First a preliminary analysis or feasibility study should be performed. The feasibility study looks into the technical, economic, operational and political implications and restrictions associated with the proposed system. After considering these factors, the formal objectives and a sense of the scope of the project are known. If the proposed system is technically, economically, operationally and politically

feasible, a decision can be made to proceed with the system planning based upon a preliminary cost benefit analysis done by comparing the objectives against against a rough cost from the feasibility study.

The ADP Plan, as mentioned earlier, is a planning tool used by the Coast Guard and the Department of Transportation to budget for ADP equipment and services over a 5 year time frame. Submission to the ADP Plan should occur as soon as possible once a determination is made that the proposed system merits further consideration and could possibly be acquired.

Defining system's requirements follows the feasibility study. When the scope of the project is understood, the determination of need and requirements analysis addresses considerations such as the type of information to be processed, security and privacy concerns, volume of data, probable benefits, site preparation and risks [Ref. 9: Sec. 201-30.007]. See Appendix H for minimum requirements analysis considerations.

For existing systems, conversion costs must be considered to insure that ADP needs are met at the lowest overall cost. Conversion costs include software conversion, site preparation and modifications, and travel and training expenses [Ref. 9: Sec. 201-30.012-2]. As a rule they are expenses that would not normally be incurred without transition to a different system. Comprehensive software conversion studies are required in the following instances:

- The estimated purchase price or life cycle cost of the system is expected to exceed \$2.5 million; or
- The cost of the conversion is to be used as primary justification for a compatibility limited requirement.

If it becomes necessary or desirable to add to or replace a system with equipment which must be compatible with the existing system, a statement justifying the compatibility limited requirement must be prepared. The justification must include [Ref. 9: Sec. 201-30.009-3]:

- Software conversion study
- Mission essential data processing requirements
- Analysis which shows the proposed method is lowest overall cost over the system life.

Appendix I contains the considerations for determining whether a compatibility limited requirement is justified.

Completion of the various studies described above brings the planning phase to a close. The studies are prerequisites and necessary enclosures for documents to be submitted during the approval phase.

2. The Approval Phase

All the planning in the world can be done for a project, but that project will never progress until those in the position of approval grant their authorization to proceed with the project. Three major objectives make up the approval phase.

First, advance approval must be sought through the ADP Plan. From the reported information, an obligation ceiling for ADP is passed down from OMB through DOT, eventually down to the level seeking authorization for its project. Project approval for the ADP Plan should be requested one year prior to its desired approval. The approval request is then published in the ADP Plan.

The second major objective is to gain approval of the mission need statement, and if one is required, the initial acquisition paper. These two documents taken together, provide a formal statement of the project, an analysis of the costs and benefits, scheduled milestones, and other project management considerations. Refer to Appendices A and C for the contents of the acquisition paper and mission needs statement, respectively. The actual approval process for the MNS and AP is covered in Section B of this chapter, Major Systems.

Finally, procurement authority for ADP equipment and services rests, by law, with the General Services Administration. Blanket procurement authority is delegated to agencies, not to exceed specified dollar thresholds. In cases where the projected costs will exceed the delegated procurement authority, an agency procurement request must be submitted to GSA through the Coast Guard chain of command and then through DOT. DOT review is contingent upon the project's appearance in the ADP Plan. GSA requires the MNS, a conversion study and, if appropriate, a determination of compatibility requirement. GSA approval of the APR results in the granting of a delegation of procurement authority. The DPA may contain restrictions and or specific reporting requirements which apply to the particular acquisition. Section D of this chapter, Procurement Authority for ADP Resources, describes the agency procurement request process in more detail.

Completion of the approval phase corresponds to Key Decision 1 of DOT's implementation of the A-109 process. Key Decision 1 is the authorization to proceed with the exploration of alternative system design concepts. Key Decision 1 actually

occurs earlier in the acquisition process than the completion of the approval phase. Approval of the initial acquisition paper is Key Decision 1. The approval phase goes one step further by obtaining approval of the agency procurement request, which contains the approved mission need statement and other pertinent information from the initial acquisition paper.

3. The Solicitation Phase

The purpose of the solicitation phase is to prepare a request for proposal (RFP) to be made available for all parties interested in bidding on the proposed system or service. The conclusion of this phase occurs when the deadline for bids passes and the evaluation of proposals commences.

A selection plan (SP) is prepared by the contracting officer in coordination with the program office responsible for the project. Appendix J contains the details of a selection plan. Approval of the selection plan is required prior to issuing the RFP.

The Source Selection Official (SSO) approves the SP. In the case of large contracts, greater than \$2 million, the Assistant Secretary for Administration is the SSO, unless he/she chooses to delegate the authority. Submission of the selection plan to the SSO should be withheld until an acquisition paper has been approved if the procurement falls under the review of DOT Order 4200.9A, Acquisition Review and Approval, or DOT Order 4200.14B, Major Systems Acquisition Review and Approval [Ref. 11: p. I-1].

Members of the Source Evaluation Board (SEB) are specifically designated in the approved selection plan. Source Evaluation Board duties take priority over normal duty assignments [Ref. 11: p. III-3]. The SEB is made up of a maximum of 7 members. Evaluation teams are formed from the members of the SEB. Advisors and experts outside the membership of the SEB may be brought in to assist the teams. However, acquisition related information available to those personnel should be limited to that which is necessary for satisfactory completion of their tasks. Source Evaluation Board recommendations are submitted to the SSO to provide assistance in and a basis for the selection/award decisions made by the SSO.

Work on the RFP may begin sometime before approval of the selection plan. The request for proposals is prepared by the contracting officer. A draft RFP may be released to industry for questions and comments. Questions and comments from potential bidders clarify ambiguities in the RFP. More responsive, higher quality bids result from this process. The final RFP is typically available for review by the Source

Evaluation Board at one of its early meetings. The SSO is briefed on the RFP after it is reviewed by the SEB.

Development of a source list, and evaluation criteria must be completed before the RFP can be considered for release. The source list contains recommended sources, but does not implicitly exclude any source not on the list. The evaluation criteria and weighted scoring procedures must be completed prior to issuing the RFP to insure impartial evaluations, and to let the bidders know what is considered important in their proposals. RFP information is contained in Appendix K.

Proposed contract actions greater than \$25,000 must be synopsized in the Commerce Business Daily (CBD) [Ref. 7: Part 1.5]. The notice must appear in the CBD at least 15 days before release of the RFP. This gives interested vendors, who do not appear on the source list, an opportunity to request a solicitation. At a predetermined date vendors, both on the source list or requesting solicitations, are sent a copy of the RFP. Deadlines for bid/proposal submissions are set. The deadline may not be less than 30 days from the release of the solicitation.

4. The Evaluation Phase

The evaluation phase begins after the solicitation deadline has expired and proposals have been received. Proposals arriving after the announced deadline are typically not evaluated. The SEB is convened to evaluate the proposals. First, a preliminary review is made of the proposals. Specifically, the SEB looks for proposals that may be eliminated at this early stage, before detailed analysis is performed. Proposals that are deficient in one or more areas or show that the offerer did not understand the solicitation are eliminated. Eliminated offerers are notified as soon as possible concerning the reasons for elimination, and to inform them that resubmission of their proposals will not be considered.

Next, the evaluation team begins analysis of the proposals. Ambiguities in any proposal are directed back to the SEB. The SEB forwards them to the contracting officer, who contacts the offerer for clarification. After ambiguities are worked out, the teams evaluate the proposals based on the approved evaluation plan and weighting criteria.

To evaluate the operation and performance of proposed systems, the use of operational capability demonstrations (OCD) and performance validation techniques, such as benchmarking, are required in contracting for ADP equipment systems, components and software [Ref. 9: Sec. 201-24.215]. The usefulness of the OCD

depends on the quality and completeness of the systems requirements in the RFP. One of the teams from the SEB will observe and score the OCD's. After evaluations are complete, each team provides a written report to the SEB describing the strengths and weaknesses of the various proposals.

A preliminary determination of competitive range is made by the SEB. This determination eliminates all proposals that do not have a reasonable chance of being selected for final award. Those offerers eliminated at this point are promptly notified of the reasons for their elimination and that resubmission of their proposals will not be considered.

Offerers who remain are given the opportunity to improve their proposals. Weaknesses and/or deficiencies are pointed out to them. No recommendations are made concerning how to improve or correct the proposals. Major rewrites of submitted proposals are not allowed at this stage and should not be considered. Revised proposals are rescored by the teams. Final scores from this stage are presented to the SSO in a written report.

Completion of the evaluation phase corresponds to Key Decision 3. Recall that Key Decisions 2 and 3 are typically combined for acquisition of off-the-shelf ADP resources. Referring back to Figure 4.1, Key Decision 3 marks the end of Evaluation of Alternative System Design Concepts, and Test and Demonstration phases of the DOT A-109 implementation. At this point the acquisition paper should be completely updated for review by the approval authority to proceed into the next phase.

5. The Selection Phase

Based upon the Source Evaluation Board's report, the SSO returns a determination to the SEB of contractors within the competitive range for contract negotiation. This is the beginning of the selection phase.

Prior to negotiations with contractors the SEB advises the negotiating team of factors it considers important. The SEB also reviews the negotiating team's position and objectives before commencement of negotiations.

All offerers are permitted adequate time to alter their proposals based on topics discussed in negotiations. Best and final proposals should be submitted by the date specified. The SEB reevaluates the best and finals but does not necessarily have to completely rescore them. The board prepares a written report to the Source Selection Official. The SSO then selects the offerer who will be awarded the contract and documents his/her decision.

The selection phase is not complete until the unsuccessful bidders have been debriefed concerning their elimination from consideration. The contracting officer along with members of the Source Evaluation Board discuss the strengths and weaknesses of their proposals, individually. No comparisons are made. Only information pertaining to the particular proposal is discussed. Debriefing is done to acknowledge the efforts made by bidders. More importantly, it is used in hopes of receiving higher quality bids for future acquisitions.

Completing the selection phase corresponds to Key Decision 4, Commitment of a system to full production. Although full production may not be an appropriate term for off-the-shelf ADP equipment and services, commitment to a system very accurately describes the Key Decision.

6. The Implementation Phase

The implementation phase commences at the conclusion of the selection phase. This phase covers the activities associated with establishing the ADP capability within the Coast Guard. Justification of the individual need for resources should be submitted by the requesting activity to the appropriate approval authority. For example, for Coast Guard wide applications the approval authority would be the responsible program manager. Funding sources should also be included with the justification. Hardware configurations and software requirements should be approved in coordination with a central technical office to insure system feasibility and compatibility with Coast Guard standards.

7. Iterative System Evaluation Cycle

A periodic system evaluation is one of the most important life cycle events, yet it is easily forgotten once the effort of acquiring a system is finished and the excitement has faded. The people involved with the acquisition typically go away and leave the system to the users.

Several publications address the need for this evaluation. The Federal Information Resources Management Regulations call it an audit of installed systems; DOT Order 1370.9 refers to it as a post-installation audit; and the Department of Defense has a cyclic life cycle phase for ADP systems, called a systems effectiveness review.

A thorough review of any system is needed after it has achieved operational status. The primary objective is to determine if the system has achieved the cost and benefit goals which formed the basis for the decision to proceed with the system. Where their goals were not met, a new decision is required -- on the

basis of the achieved benefits and the continuing cost to operate and maintain the system -- as to whether the effort should be continued or abandoned. The post-installation audit also provides an excellent method of evaluating and improving the planning and development process. Post-installation audits must be planned to check accuracy, quality, and completeness of the system. [Ref. 12: p. 4]

The life cycle of an ADP system begins when planning is started and continues until disposal of the system. Studies, evaluations and other documentation are required during the acquisition portion of the life cycle. The historically and hopefully longest life cycle phase is the deployment and operation phase. An adequately planned system should satisfy its requirements for a sufficiently long period of time to justify itself and then some. It does not make sense to quit managing and documenting a system after the acquisition has been completed. The majority of the system's life cycle remains after the acquisition is finished.

The iterative system evaluation cycle at the end of one system's life cycle may coincide with the planning phase for the system that will eventually replace it.

V. THE ORIGINAL STANDARD TERMINAL ACQUISITION

A. THE ACQUISITION

The Coast Guard Standard Terminal is an acquisition that has affected the Coast Guard in virtually every activity and mission it performs. Standard terminal systems maintain pay data (JUMPS), marine safety information (MSIS) and many other applications including unique programs written by local programmers for a particular unit. Standard terminals are found everywhere in the Coast Guard, from headquarters offices, to research and development facilities, to ships on patrol. This chapter contains a brief acquisition history of the Coast Guard Standard Terminal. The process used to acquire this resource will be presented using the acquisition model described in the previous chapter.

1. The Planning Phase

Development of several major applications was under consideration during the late 1970's. Requirements for the standard terminal were based on the requirements for those applications. As the planning progressed the requirements matured. What originally started out as a dumb terminal grew into a powerful microcomputer with telecommunications features and the capability to be configured in a cluster.² Commandant Note 5233, dated 11 June 1979, solicited input from the Coast Guard to help determine what capabilities were necessary and desirable. The request for input from the whole Coast Guard got everyone involved in the requirements analysis. However, it seems the requirements for the system had pretty much already been determined by the major applications needs. The Commandant Note asked for input on such things as keyboard layout and other terminal features which would not severely impact the proposed system as it stood at that time. The survey gathered input on the degree to which the proposed standard terminal characteristics were desired and/or necessary.

Soon after the Coast Guard decided to proceed with the acquisition of a standard terminal, lead members of the project began selling the concept and benefits to high level Coast Guard and Department of Transportation officials. Because this was the first attempt at a major standardization project which would also put high

²Local Area Network (LAN)

computer capabilities at all levels of the Coast Guard, the project was viewed as more political than anything else. High level briefings were used to get the support of those who could do the most to keep the momentum of the project going. They were also used to help prevent the shift of inertia against the project. In addition to the applications envisioned at that time, the standard terminal was presented as a capability that would be used by the Coast Guard in more ways than could be conceived of then. Because of the relatively new technology concerned, many project managers had difficulty grasping the potential benefits it would provide to their programs. Budgets and specific requirements were avoided until the concept was sold. Later, technology reports in computer publications such as BYTE and ACM would help provide the acquisition team with some of the required and optional features in the standard terminal specifications.

The standard terminal concept was submitted to the Coast Guard ADP Plan. A description of the applications to be satisfied and the Coast Guard ADP requirements, both current and future, were identified as goals to be achieved by implementation of the standard terminal.

The Coast Guard established a policy to place ADP costs with the people using the capability. Users pay for what they need and use. Consequently, no standard terminal RCP was approved to pay for the whole project. Rather, individual program managers were left to determine the standard terminal requirements for their programs and submit budget requests for those needs.

2. The Approval Phase

Because the estimated cost of the acquisition exceeded the Coast Guard's and DOT's blanket procurement authority, an agency procurement request was submitted to GSA. The APR submitted on 20 August 1979 estimated the terminal acquisition costs at approximately \$6 million over a 5 year contract life. Review by the General Services Administration took about 3 months. The delegation of procurement authority was granted by the Assistant Commissioner for Agency Services and Procurement in a letter dated 14 November 1979.

The standard terminal appeared in the first Coast Guard ADP Plan promulgated on 11 June 1979. Although no specific mention of approval is found in the first ADP Plan, conceptual approval must have been granted by this point in time by the Coast Guard and the Department of Transportation because the project continued.

Figure 5.1 depicts the activities which occurred during the planning and approval phases of the standard terminal acquisition.

By April 1980 the acquisition had gained two of the three approval objectives mentioned in the model; the delegation of procurement authority had been granted, and the ADP Plan submission was approved. The third objective in the model is approval of the acquisition paper. Research through the remains of the acquisition file turned up no sign of an acquisition plan. Acquisition schedule goals and milestones appear on several documents. However, the fact that no acquisition plan exists (or can be found) severely impairs the depth of review possible. Referring back to the secretarial review process, this acquisition's original estimated cost of \$6 million did not meet any of the criteria for secretarial review. Therefore, no acquisition paper was required. The acquisition team realized the A-109 process would apply to the standard terminal both in concept and cost. Cost estimates were deliberately kept low to keep the project from being administratively delayed in the A-109 process.³

Having gained what approval was necessary the acquisition process moved into the solicitation phase.

3. The Solicitation Phase

According to my model the solicitation phase begins upon the approval of the selection plan. A memorandum from the Coast Guard Commandant to the Secretary of Transportation, via the Deputy Secretary, was approved as the selection plan. The selection plan, dated 7 February 1980, contained recommendations, an acquisition schedule and nominations for the Source Evaluation Board members. Two documents followed which completed the selection plan. "Source Evaluation Board Procedures for Evaluating Proposals" was distributed on 16 June 1980. And, a letter assigning the SEB evaluation teams was signed on 14 July 1980.

As I mentioned in the model, work on the request for proposal may begin prior to the approval of the selection plan. That is exactly what occurred in this acquisition. A draft RFP was sent out to industry for comments of 5 December 1979, five months before the selection plan was written. The final RFP was released to bidders on 7 June 1980. Solicitation phase activities are shown in Figure 5.2.

³E.M. Fiegel, "Trip Report of 2 July 1986", summary of an interview with Dr. Joseph Dicensa, project officer for the original standard terminal acquisition, 3 July 1986.

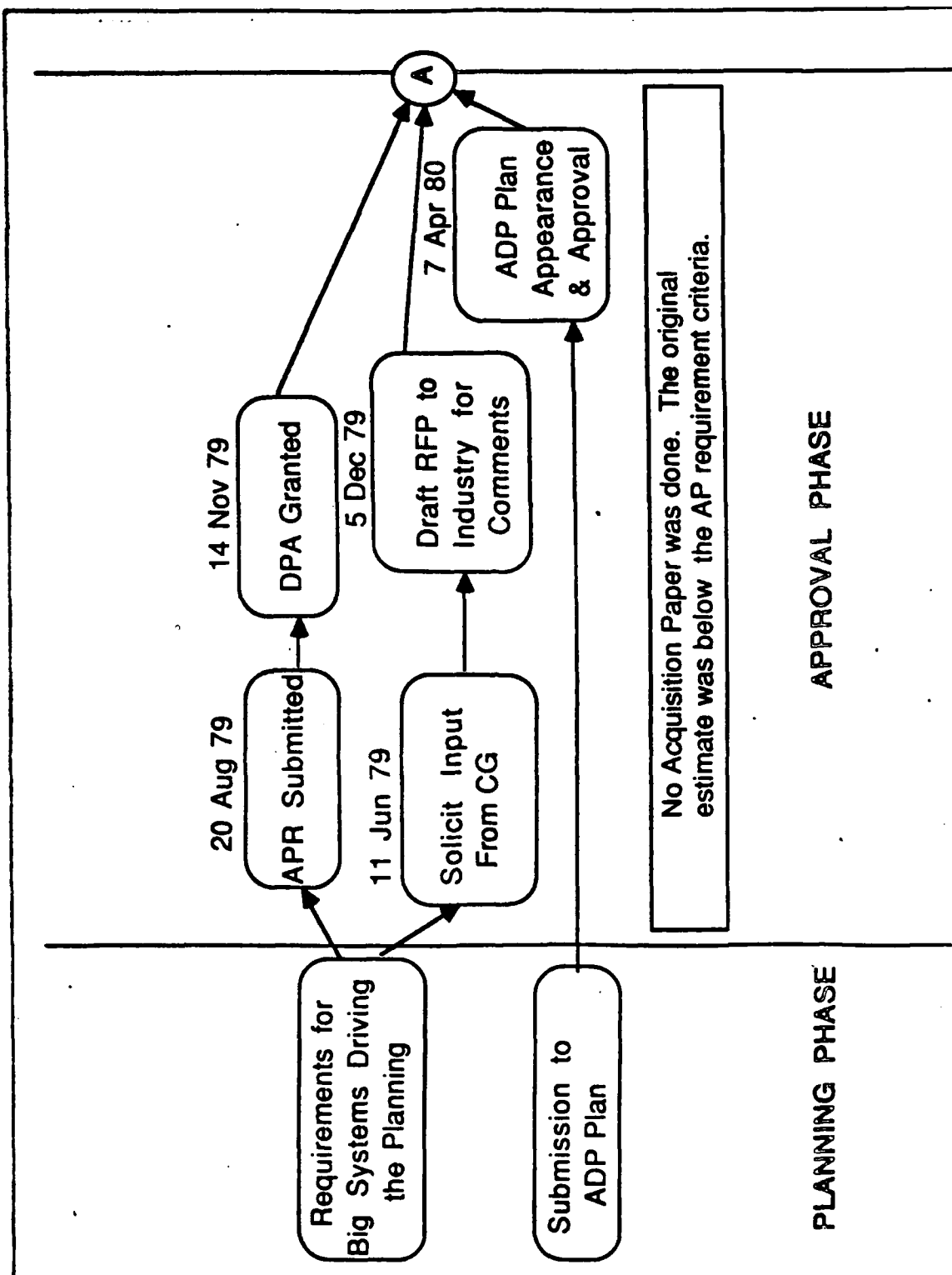


Figure 5.1 Standard Terminal Planning and Approval Phases.

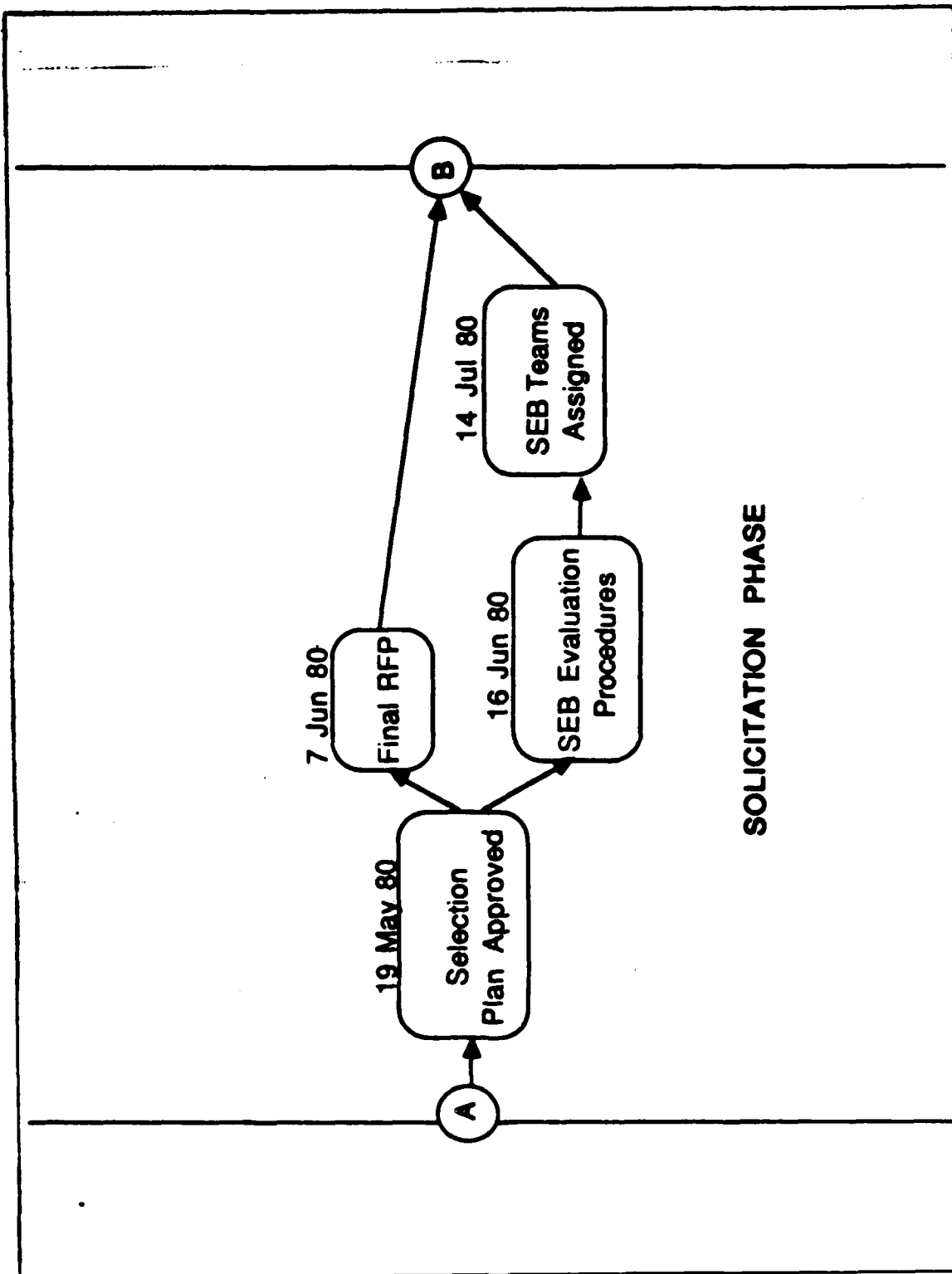


Figure 5.2 Standard Terminal Solicitation Phase.

4. The Evaluation Phase

The evaluation phase began after the deadline for proposals had passed. A total of seven proposals were received by the closing date, 2 December 1980. Evaluations by the SEB teams commenced soon after that. Operational capability demonstrations began on 9 March 1981 and continued through 30 March 1981. Contractors were each scheduled for a 2 day demonstration.

Efforts of the Source Evaluation Board teams were delayed by job responsibilities of the team members.⁴ Interruptions and delays in SEB team meetings at headquarters had an adverse impact on the effectiveness of the SEB teams.

More serious problems were to come. The final months before contract award brought a major turnover in project personnel. Military transfers and a retirement removed the acquisition leaders from the project and left less experienced people to take their places. Although the majority of the acquisition milestones had been achieved, it is obvious that the turnover affected the initial distribution and management of the standard terminal.

5. The Selection Phase

Preliminary reports from the SEB on the evaluations were made to the SSO. On 23 March 1981, the SSO approved "an optional approach to competitive range". Although the document explaining this approach was not found in the acquisition file, it appears to be the SSO's determination of contractors within the competitive range for contract negotiations. With the determination of competitive range the selection phase began.

For various reasons, technical noncompliance, failure of the OCD, or late submission of their proposal, the number of bidders going into contract negotiations was reduced to two. 14 May 1981 was the deadline for best-and-final offers for this contract. Final Source Evaluation Board review was completed on 8 June 1981, and the contract for hardware, software and support services was awarded to C3, Incorporated on 29 June 1981 for services estimated at \$45.4 million. It was a firm fixed price requirements contract with options to renew annually. Procurements from the contract to be allowed for a maximum of 60 months and maintenance support services for up to 120 months. Contract award came more than a year later than the acquisition schedule in the 7 February 1980 selection plan, and at more than seven

⁴Telephone interview with LCDR Tim Fowler, Coast Guard Headquarters, 19 June 1986.

times the cost estimated in the agency procurement request. Significant activities in the evaluation and selection phases are shown in Figure 5.3.

6. The Implementation Phase

After contract award, some hardware and software were distributed to various sites by program managers. Application software was slow to be distributed due to development delays. Development software available to users was utilized in producing various local applications. However, in some cases the hardware went untouched because the sites were not adequately prepared to use it. The standardization discussed in the C3/IRM Plan has been slow in becoming a reality.

Realizing that better acquisition justification was necessary, a Commandant Instruction addressing the issue was distributed to the Coast Guard [Ref. 13]. The instruction requires justification documentation to be submitted with the procurement requests for any ADP acquisition from any source for less than \$50,000, or for any ADP acquisition procured from the standard terminal contract. Copies of the justification documentation must be kept in a system acquisition file. Systems procured prior to the date of the Commandant Instruction were required to work up adequate documentation to place in their acquisition file, although no approval was required. This justification process of existing systems identified under-utilized and unused equipment for redistribution to sites with documented needs.

7. The Iterative System Evaluation Phase

User support was lacking after the contract was awarded. No formal communications existed among Coast Guard users. Furthermore, there was no effective liaison between the Coast Guard and the vendor for user support.

The Systems Management and Engineering Facility (SMEF) at Station Alexandria, Virginia was tasked with the configuration management duties for the standard terminal. SMEF also provides the liaison between the Coast Guard and C3 Incorporated. Also, the information center concept was introduced to establish formal communications channels within the Coast Guard. Information centers are set up at each Coast Guard District office and Headquarters as a central contact point in their respective areas. Information centers are used by users seeking assistance. They also disseminate Coast Guard ADP policy to the standard terminal users.

Otherwise, the iterative system evaluation phase has consisted mainly of studies necessary to eventually replace the existing standard terminal systems and their support.

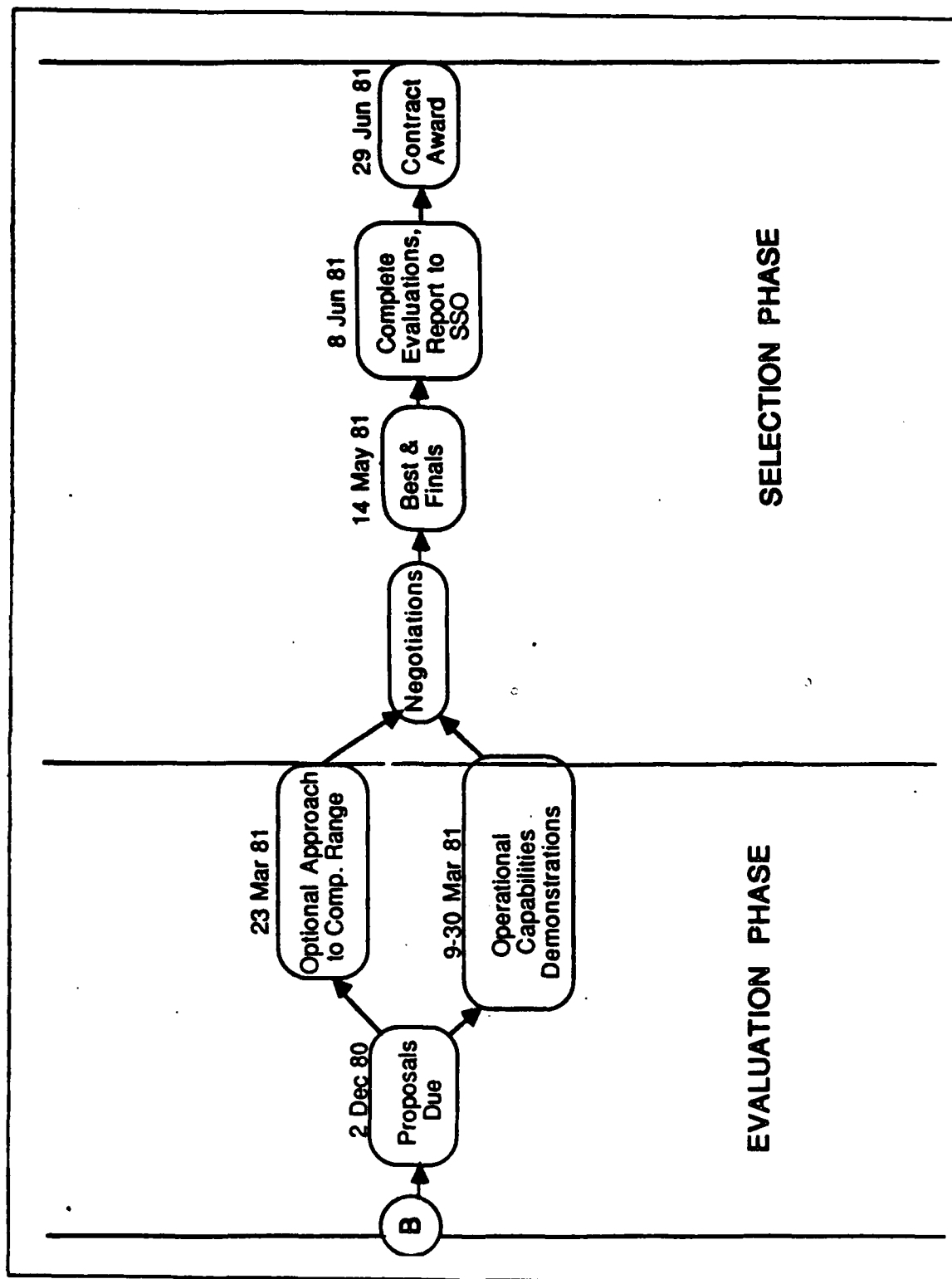


Figure 5.3 Standard Terminal Evaluation and Selection Phases.

- April 1985 - Feasibility Study⁵
- August 1985 - Procurement Plan⁶
- February 1986 - Software Conversion Study⁷
- April 1986 - Functional Requirements⁸
- May 1986 - Acquisition Support Plan (draft)⁹
- May 1986 - Comparative Cost Analysis¹⁰

System evaluations can occur at many levels. Considering the standard terminal as a Coast Guard system, a system review would evaluate how the standard terminal meets the needs of the Coast Guard. System reviews of major applications should also be done to determine how effectively the standard terminal is fulfilling the requirements of the application. Finally, a system review can be performed for a single site, like a group office or ship. Reviews of this sort would determine the adequacy of the resource in an office or stand alone environment.

Although some systems have been evaluated,¹¹ it does not appear that a periodic post-installation audit occurs on a formal basis for most systems. However, brief site evaluations are done because users must justify acquisition and expansion of their systems procured under the standard terminal requirements contract.

B. CONTRACT EXECUTION

Funding for procurement of equipment and services from the standard terminal contract has come from the various operating and support programs. After the acquisition process was completed, RCP's submitted by program managers have

⁵*Feasibility Study, Standard Terminal Re-Competition*, U.S. Coast Guard, Office of Command, Control, and Communications, April 1985.

⁶*Standard Terminal Procurement Plan*, U.S. Coast Guard, Office of Command, Control, and Communications, August 1986.

⁷*Standard Terminal Software Conversion Study Final Report*, Wilson Hill Associates, Inc., Washington, DC, 18 February 1986.

⁸*Functional Requirements for the U.S. Coast Guard Standard Terminal*, Federal Computer Performance, Evaluation and Simulation Center, Alexandria, VA, April 1986.

⁹*Standard Terminal Acquisition and Support Plan (ASP) Review Board Meeting*, 29 May 86, U.S. Coast Guard, Commandant (G-Tt) Memorandum 10550, 9 May 1986.

¹⁰*U.S. Coast Guard Standard Terminal Replacement Cost Analysis, Comparative Cost Analysis*, American Management Systems, Arlington, VA, 27 May 1986.

¹¹The 13th Coast Guard District has conducted at least two district wide studies, *Thirteenth District United States Coast Guard Standard Terminal Survey*, 29 June 1984, and *Thirteenth District United States Coast Guard Computer Users Survey* 1985, 23 October 1985.

included funds for procurement of standard terminals. The Coast Guard uses this rationale to justify the claim that this project, with an estimate of \$45.4 million at contract award, did not fall under secretarial review. Procurement was broken up into smaller purchases by the many programs. The Coast Guard reasons that they merely provided the technical expertise in acquiring the ADP capability for the programs to use as necessary. Therefore, it was in fact many smaller systems that were procured rather than one large Coast Guard system. Both sides could present valid arguments, however, this rationale was used successfully to complete the acquisition and secure funding for the standard terminal.

The standard terminal contract has been renewed annually over the past 5 years. Because of the changing Coast Guard requirements and technology improvements, the contract has been modified many times, 35 modifications by 20 November 1985. Modifications have added and deleted equipment and services from the contract. Price adjustments have also occurred as a result of negotiations with C3, Incorporated. A significant modification was issued on 30 October 1985. The maximum order limit on hardware items (terminals, storage devices, printers) was increased to correspond with the maximum limits allowed in the delegation of procurement authority from GSA.

By 1 July 1986 an estimated \$66.6 million had been spent on procurements from the standard terminal contract. Because standard terminal equipment was not accepted until September 1982, the 5 year procurement contract with C3, Incorporated is not expected to expire until September 1987.

VI. CONCLUSIONS AND RECOMMENDATIONS

In the first chapter I outlined the purpose for conducting the research into this particular subject, to provide lessons learned from the original standard terminal acquisition. I have avoided in-depth contracting issues because of my limited knowledge and experience in that field.

Several studies have been conducted which have resulted in recommendations to improve the acquisition process and to provide more effective management of standard terminal systems. Others have written their own lessons learned letters and documents which have pointed out shortcomings in the management and acquisition process. Those studies are listed among other reference material in the bibliography. It seemed inappropriate and redundant to restate recommendations and conclusions presented in other studies. Rather, I chose to limit my findings to significant management and acquisition issues which, in my opinion, have not been adequately documented or considered.

A. SYSTEMS MANAGEMENT ENGINEERING FACILITY

Conclusion: *SMEF provides significant management functions and user support that was previously nonexistent or inadequate.*

After the acquisition of the Coast Guard Standard Terminal was completed, the system was not effectively managed with regard to user support. Convergent Technologies and C3, Incorporated were swamped with calls from users. Calls ranged from inexperience problems from new users to software and hardware enhancement suggestions. There was virtually no control over direct communication with the equipment supplier. Realizing that a more controlled, effective approach was necessary the Coast Guard appointed a Systems Management and Engineering Facility, currently at Coast Guard Station Alexandria, Virginia, as the direct liaison for the Coast Guard to the equipment manufacturers and suppliers. Support requests and complaints work their way up from the users to a central point at the cognizant Coast Guard district or Headquarters information center. Requests reaching this point are sorted out. Those requests that can be handled at this level go no further. Others that are beyond the scope of the information center are funneled up to SMEF. SMEF advisors and specialists typically have the knowledge and experience to immediately assist with

support requests at their level. If not, they have the resources and authority to work out a solution on their own or in coordination with the equipment/services suppliers and manufacturers. Centralized user support and support documentation provided by SMEF reduce the administrative burden on everyone involved in the process. It also saves time in the identification and solution of problems since they need only be solved once rather than many times. An electronic bulletin board has been established to provide easier communications with SMEF.

SMEF also provides the same type of support with configuration management. The program managers, project officers, equipment suppliers, users and SMEF itself submit change proposals for hardware and software. Evaluation, approval or disapproval, documentation, change management and monitoring the status of changes are all configuration management functions of the Systems Management and Engineering Facility.

The establishment of the SMEF was an extremely valuable move for the management of the Coast Guard Standard Terminal. SMEF evaluates, approves and distributes new software releases. It acts as the technical liaison for the Coast Guard in matters concerning the standard terminal. Configuration management is administered by the competent group of individuals that make up that organization. Without SMEF providing its support and guidance, the standard terminal concept would not have attained the level of use and acceptance that it has.

B. FUNDING

Conclusion: Because no funds were budgeted for the original standard terminal acquisition, phases of the acquisition were altered to take advantage of money when it was available.

Throughout the acquisition process a constant concern is the cost of the system. Beginning in the planning phase, the feasibility study provides a gross cost estimate, possibly only the order of magnitude. Submissions to the ADP Plan provide the first budget figures to budget planners as the system gets closer to reality. The mission need statement, acquisition papers, and agency procurement request require proposed budget information before they are approved. Yet with all the requirements to develop budgets and spending plans the managers of an acquisition could possibly never have a budget commitment. Contract award may occur with no money budgeted for that contract. Given the current austere budget situation for the entire Government makes

this no less surprising. Why allow so much time, effort and money to go into a project that may never be adequately funded?

Program managers such as the Office of Command, Control and Communications have funds worked into their budgets to perform the studies and evaluations necessary to insure their programs provide an adequate level of support to their program constituents. Feasibility studies, requirements analysis, and conversion studies are among the acquisition process studies which are funded out of operating and contingency dollars worked into those budgets.

Even though the acquisition studies get funded as the process progresses, there is not necessarily a commitment to fund the project. Resource change proposals (RCP) are submitted and may or may not be approved. The acquisition process could still continue after its RCP has been denied. The original standard terminal acquisition was paid for with money reprogrammed by various program managers. This caused phases of the project to be rushed to avoid funds from expiring at the end of a quarter or fiscal year. Equipment was also paid for out-of-hide or by using money budgeted for office equipment.

To avoid repeating this scenario there should be milestones in the acquisition process that correspond to milestones in the budget process. A project should not be allowed to continue without a budget commitment. At the time the initial acquisition paper is approved, the Department of Transportation should take on the commitment to fund the project, at least partially.

Recommendation: *Acquisition milestones should coincide with budget process milestones to insure adequate funding is available for contract execution.*

C. EVALUATION TEAMS

Conclusion: *Unnecessary interruptions and delays, due to other duties and job obligations, adversely affected the efforts of the SEB teams.*

Teams made up of members of the Source Evaluation Board and advisors evaluate offerers proposals. The selection plan, prepared by the contracting officer in coordination with the responsible program office, explicitly identifies each member of the Source Evaluation Board. Prior to including someone on the SEB, it should be determined whether or not that person will be able to devote the necessary time to the board. Members and their bosses should realize that Source Evaluation Board duties take priority over normal duty assignments.

Several of those interviewed mentioned problems and delays in getting their team members together at times during the original standard terminal acquisition. Team members attended team meetings at headquarters in Washington, DC. Most team members were stationed at headquarters. While this sounds convenient on first consideration, it sometimes hindered the efforts of the teams. First of all, team members at headquarters often find it difficult to ignore normal duties. Their co-workers, both senior and subordinate, may also find it difficult to allow team members to devote full time and attention to the Source Evaluation Board. Distractions and delays were caused by this situation.

Avoiding this situation would allow the Source Evaluation Board members to perform their duties at their own pace, undisturbed. Sending the SEB members on temporary assigned duty (TAD) would provide them with the job isolation necessary. Temporary duty at a private meeting place could cost more money than available, plus it might be difficult to justify. Perhaps TAD to Station Alexandria Virginia would be the best solution. Members would be isolated from their jobs, unless team members were from Station Alexandria. Station Alexandria is convenient to headquarters, which would avoid costly travel and per diem expenses. Because Station Alexandria is a Coast Guard unit, team members would not lose the benefit of operational and administrative support. Communications facilities are also available. Finally, some of the most knowledgeable computer people in the Coast Guard are stationed at Station Alexandria. This could be advantageous if it becomes necessary to seek advice outside of the SEB evaluation team.

Recommendation: *Isolation of the SEB teams away from their jobs should be allowed during evaluation periods.*

D. EXPERIENCE AND TRAINING

Conclusion: *Project officers play the most important role in determining whether or not an acquisition project effectively achieves its intent within time and budget constraints.*

It is obvious that the Government is concerned that the big money which is spent on major systems should be managed effectively. A recent amendment to Title 10, U.S.C. Section 85.1622, requires that program managers in Department of Defense major systems acquisitions have a minimum of eight years experience in related technical fields and acquisition [Ref. 14: p. 9]. Although the cost and scope of the intended DOD major systems far exceed that of the standard terminal, proper

management and control techniques will help projects achieve success within minimum cost and time regardless of the size. Experience, training and education are three factors that will benefit the program manager in fulfilling his/her responsibilities.

At the time of the original standard terminal acquisition, its project officer had very little experience in the ADP field. He was a general line officer in the Coast Guard with a one week ADP course behind him. His acquisition experience with ADP was more extensive, however. He oversaw the network procurement resulting in the GTE Telenet service contract, and participated in a minicomputer acquisition for the Operations Computer Center at Governor's Island, NY. In fact, there were very few people fully qualified to manage a large integrated microcomputer acquisition because a project of this scale with micros had never been done before.

Now ADP experience is available in the Coast Guard. The Coast Guard should utilize its personnel where they can contribute the most to the service. Project officers should be selected on the basis of experience, education and willingness to perform the job, not merely to fill an open billet.

Recommendation 1: *Project officers should be selected based on experience, education, training and enthusiasm for the project.*

Recommendation 2: *ADP oriented career paths should be formally developed to insure an adequate pool of officers is available with the necessary experience to manage the Coast Guard's C3/IRM programs.*

E. PROJECT PERSONNEL CONTINUITY

Conclusion: *The original standard terminal acquisition team was broken up during a critical time before the acquisition was complete.*

One of the most recurring comments made during interviews was the lack of continuity in the management of the original standard terminal acquisition. The project was driven by the enthusiasm and foresight of a few Coast Guard officers. Their job was monumental considering the scope of the project they undertook, not to mention the new technology concerned. The management team began breaking up because of military transfers and discharges shortly before the project was completed. Relatively inexperienced personnel were put into top positions to finish up. During the transition much of the documentation and expertise were lost.

It seems like such a basic idea, to put a team in to work on a project and leave them there until the project is done. Although transition is inevitable in the military,

scheduling the transfer of personnel to avoid the critical stages of an acquisition would avoid unnecessary problems in an already complicated process.

Except in cases where the project officer is carrying out his/her responsibilities unsatisfactorily, the project officer should see the project through to completion. If that is not possible, sufficient relief time should be allowed for the successor to benefit from the experiences and lessons of the predecessor.

Recommendation: *The acquisition team, especially the project officer, should remain with an acquisition until the project is finished.*

F. REGULATIONS

Conclusion: *Information concerning ADP acquisitions is difficult to gather because of the numerous sources, some of which are outdated.*

Research into the acquisition of ADP equipment and services was a very enlightening and frustrating experience. Regulations and requirements concerning the federal, Department of Transportation and Coast Guard acquisition processes are spread throughout numerous documents and publications. The majority of Federal acquisition information related to ADP is contained in the Federal Information Resources Management Regulations which is published by the General Services Administration. That publication is in a sense the bible to which all Government agencies must conform in ADP matters. The Department of Transportation has DOT Orders that are outdated, contradictory and confusing. The Coast Guard directives concerning ADP are no better. It does not seem unreasonable to expect the Coast Guard ADP Management Manual to be a useful source of information in a research projects such as this thesis. It was not.

The Department of Transportation and the Coast Guard should undertake a comprehensive review of their publications. Benefits such as more up-to-date and comprehensible information would assist those personnel with the need for that information. After all, of what good is an outdated publication?

The Department of Defense has more regulations for ADP acquisition than DOT and the Coast Guard combined. DOD does, however, have an ADP Supplement to the Federal Acquisition Regulations. Such a supplement to the Transportation Acquisition Regulations (TAR) would certainly help to eliminate any ambiguity or confusion on the requirements for ADP acquisition. The research for a TAR Supplement covering the acquisition of ADP resources need only be done once, rather

than repeating the drill each time an acquisition commences. A step-by-step acquisition process that can be tailored to individual projects should be developed and published. Regulations mandate the legal and proper process to acquire ADP resources. Having to search through volumes of regulations in various places increases the probability that something will be left out, ignored or forgotten.

Recommendation: *A single reference document for Department of Transportation ADP acquisitions should be developed and frequently updated.*

G. STANDARDIZATION AND COMPATIBILITY

Conclusion: *Nonstandard microcomputers can be procured with little consideration of the standard terminal requirements contract.*

Standardization is one of the most important concepts behind the acquisition of the Coast Guard Standard Terminal. A few foresighted Coast Guard officers saw the need for choosing a single type of hardware that would be able to support the various Coast Guard applications at that time and into the future. Microcomputers were just starting to come out and many organizations including the Coast Guard were scrambling to capitalize on their capabilities. Standardization back then has led the Coast Guard to its success with microcomputers today.

The standard terminal contract is a requirements type contract. That means that any application which can be satisfied by the hardware, software and/or services in the contract, must use the contract as the source for its procurement. If adequate justification is provided to acquire ADP equipment, other than that on the contract, the Coast Guard typically grants approval. In some cases the justification provided should not warrant approval, although it sometimes does. While researching my topic, one headquarters office convincingly proved this point. The office managed a large minicomputer for approximately 100 users. Justification was approved and money provided for acquisition of a Coast Guard Standard Terminal for that office. The microcomputer was never really used and was soon given to another office that had a need for it. Later, justification from the same office that had recently given away a standard terminal, was approved for the purchase of an Apple MacIntosh.

Stringent justification criteria should be required before allowing acquisition of ADP equipment and services not appearing on the requirements contract. Proliferation of noncompatible micros was the original intent. Now that the Coast Guard has such a considerable investment in the Convergent Technologies micros, it should be doubly important that our computers remain compatible.

Recommendation: *The Coast Guard should apply more stringent justification criteria before approving requests for noncompatible microcomputers.*

H. PERIODIC SYSTEM AUDITS

Conclusion: *Inadequate reviews are conducted on installed systems to insure they are effectively utilized and used for purposes for which they were justified.*

A key consideration, once an ADP system is acquired, is to periodically evaluate the system to insure its adequacy. It cannot be emphasized enough as to how important this iterative review cycle is. After implementation, the system should continue to perform its proposed functions satisfactorily. If not, redesign or reclassification of the system should occur. The goal of the acquisition process is to provide a system that satisfies the needs of the users at lowest overall cost to the government. A system not being used to its potential or so seriously incapable that it is not used, must be reevaluated. Periodic evaluations prevent a system from becoming either of the two extreme examples mentioned.

Performing a periodic system review is typically not done on Coast Guard systems, even though it is recommended and desirable. System growth, for the most part, has been determined by a select few knowledgeable users or system managers who have an idea of what they want the system to do. Use and acceptability, however, is determined solely by the system users. Therefore, periodic, formal reviews should be scheduled and performed to insure ADP systems are effectively and efficiently meeting the needs of users, managers and the Coast Guard as a whole. This program should be the responsibility of the program manager sponsoring the ADP system. Results should be reportable to the Command, Control and Communications support manager (G-T). Considering the rapid rate of change in ADP technology, the frustratingly slow acquisition process and the continuing evolution of Coast Guard missions, a biennial review cycle would suffice on a trial basis until a review provides a basis for a better audit interval.

Recommendation: *Periodic system reviews should be done at every ADP site and for each of the major applications to insure proper resource utilization and cost effectiveness.*

I. ACQUISITION DOCUMENTATION

Conclusion: *Inadequate documentation exists from the original standard terminal acquisition.*

Documentation in the acquisition file for an ADP system should include studies, correspondence and just about anything else that concerns the particular system. One source, more than any other, documents the life cycle of a system, the acquisition paper. It has been the practice of the Coast Guard to decide on its own whether or not an acquisition paper is submitted for proposed ADP systems. Avoiding unnecessary levels of bureaucracy is a valid concern in these days of acquisition delays due to the many levels of approval necessary. The acquisition paper approval process may be waived if it is convincingly proven that the system does not come under the secretarial review process for major systems acquisition (MSA) or TSARC program list (TPL). This decision, however, is to be made by the Deputy Secretary not by the Coast Guard. The Coast Guard can only provide a convincing argument.

An acquisition paper should still be developed, even if it is not required. In most cases the same general procedures should be followed for smaller systems as larger ones. The acquisition paper format is designed to contain most of the necessary information on the system's acquisition. Changes in the project are reflected so that the acquisition paper always reflects the current state of the acquisition as well as an accurate account of what has occurred to that point in time. Preparing an acquisition paper should not be considered just another bureaucratic exercise. Rather, it should be realized as the systems planning and documentation tool that it is intended to be. Had an acquisition paper been done for the original standard terminal acquisition, subsequent ADP acquisition projects throughout the Government could have tailored and fine tuned their microcomputer acquisition projects from it. The biggest benefit of all would have been to the Coast Guard at this point in time when replacement systems are under consideration.

Recommendation: *To insure systems planning and documentation are satisfactorily done, an acquisition paper should be developed and maintained for future acquisitions.*

J. DEVELOPMENT TOOLS AND APPLICATIONS

Conclusion: *Poor initial planning for applications software has left Coast Guard users with hardware and software tools that they do not know how to effectively use.*

After five years of the standard terminal the Coast Guard should strive to accomplish one of its primary objectives of the C3 IRM architecture. Data should be shared and accessed more readily. Program managers should determine what data and applications are necessary for their constituency. Specifications for the applications

could be gathered from users in the field who have developed their own systems. The benefits of lessons learned from many development efforts reduce the probability of encountering the same problems.

The standard terminal was intended to be a tool for users to access and utilize Coast Guard data. Development software is provided at no extra cost when hardware is delivered to sites. Many users and some system managers are overwhelmed by the number of software and hardware tools available to them that they do not know how to use. Others are off and running with whatever is available to them. Instead of putting their systems to use in ways intended by the C3/IRM architecture, ambitious users spend time attempting to automate unnecessary and trivial tasks, or trying to learn how to use what is provided to them.

The Coast Guard is not in the business of training programmers and systems developers. Rather the Coast Guard is attempting to utilize the C3 architecture to its fullest potential to achieve predetermined goals. Yet the delays in getting standard applications software into the field have forced users to innovate in order to make use of the standard terminal. Consequently, programs developed by local innovators typically are poorly planned, inadequately documented and virtually unmaintainable. The heirs to these applications are in a difficult position. They do not know how the programs work or if the results they provide are accurate. In most cases the costs exceed the benefits associated with this type of development approach. Instead of being a useful tool, the standard terminal has occasionally been a time and effort sink. A Coast Guard report points out that several mid-level managers have adversely affected their careers by becoming too involved in attempting to automate too many things [Ref. 15: p. 4]. These cases could refer to the very same innovation encouraged and applauded by failed planners.

The C3/IRM architecture emphasizes standard software. More effort and planning should go into accomplishing that. Adequately planned and successfully implemented applications will develop user confidence and better acceptance of the standard terminal. Data integrity and usefulness will improve if unnecessary data conversions are eliminated. Applications will benefit from standardization and a wide user base involved with using and improving the system.

Users and developers are two different groups. The standard terminal is targeted for the Coast Guard users. If the Coast Guard continues to rely on internal innovation, it should realize that those innovative efforts in programming and

implementation are using manpower, time and dollar resources that are most likely being diverted from other necessary missions. Probably every unit has had at least one experience with struggling to develop a unique application or attempting to implement another unit's development. Such efforts are obviously occurring at the wrong level of the Coast Guard where inadequate resources are available. It may seem like heresy to suggest that development tools be withheld from Coast Guard users, but that may be necessary. Creativity and innovation will not be suppressed, we should realize that those innovators are still going to be out there.

Software should be made available only after justification has been approved, similar to the hardware justification. Some cost savings may be realized by reducing software licensing and distribution. Iterative system reviews could be used to determine what software is or is not necessary for various sites. Certainly much disk space and time will be saved if several of those personnel attempting to learn Pascal or Cobol will be forced to do it at the appropriate time and in the proper environment. The proper environment could be at home on their own computer or in school or training classes, but not at work on Coast Guard resources which were not intended for that use.

The Coast Guard program managers should develop support applications. These applications, documentation and training should be available to the field units that need them. It is not realistic nor good management practice to rely on the field to develop redundant data manipulation applications to satisfy Coast Guard wide requirements.

Recommendation 1: *Program managers should take a more active role in determining the data and applications requirements for their constituency.*

Recommendation 2: *To avoid proliferation of unmaintainable locally developed applications, development software (such as Pascal, Cobol and database software) should not be distributed with every system.*

K. CHANGING COST OF TECHNOLOGY

Conclusion 1: *ADP hardware prices have continued to decline as technology improves.*

Conclusion 2: *Modifications to the standard terminal contract have allowed the Coast Guard to take advantage of price reductions and improved technology.*

Historically hardware prices have decreased as technology progressed. Technological improvements like more efficient memory or increased processor speeds

continually cause relatively new hardware to fall behind the state-of-the-art, and old hardware to become obsolete.

A fixed price requirements contract for ADP systems hardware over a multiyear time period locks the Coast Guard into fixed prices for hardware as prices fall and the contracted technology falls further behind the power curve. Essentially paying more for less. This is particularly wasteful if the majority of the procurements under the contract occur in later years. The existing standard terminal contract has been modified to reduce prices for hardware and to replace older equipment listed in the contract with more current items.

Recommendation 1: *A clause seeking periodic negotiated reductions in hardware prices corresponding to technology advances should be included in the contract if possible.*

Recommendation 2: *Incentives should be offered to bidders to add or modify hardware in the contract as new technology becomes available and economically affordable.*

L. CONTRACT INTERPRETATIONS

Conclusion: *Inadequate acquisition documentation and contract specifications have left the standard terminal contract open to interpretations.*

At the time of the standard terminal contract award no formal contract document existed.¹² The contract was put together, after the award, from documents that existed on a word processor. C3, Incorporated, the successful bidder, did not have a contract until it was provided later.

Significant contract interpretations have occurred since the award in June 1981. Under the contract, procurement of hardware was to be allowed for 5 years. That would lead us to conclude that no procurement of hardware would be allowed after June 1986. However, since no equipment was actually accepted until September 1982, the current interpretation is that the procurement part of the contract will not expire until 5 years from that date, September 1987.

Furthermore, the contract placed maximum order limits (MOL) on hardware which includes; keyboard/display (terminals), cluster controllers, direct access and tape storage devices, and printers. The differentiation between keyboard/display and cluster controllers has been lost. The standard terminal has the cluster controller capability built in. Because of the difficulty in attempting to differentiate between the two, the MOL for terminals was determined to be the sum of the MOL's for keyboard/display

¹²Coast Guard Headquarters, interview with Office of Comptroller, Procurement Division (G-FCP) personnel, 21 June 1986.

and cluster controllers. The interpretation extends to the delegation of procurement authority where the item cluster controller also appears.

It is incredible to think that a contract of major importance to the entire Coast Guard could be subject to such major interpretations. The lack of acquisition documentation precludes further investigation into the original intent. Requirements for maintaining acquisition files should be strictly enforced to avoid similar situations from occurring.

Recommendation: *All relevant documentation should be required enclosures to the acquisition file to avoid possible adverse interpretation of future contracts.*

APPENDIX A ACQUISITION PAPER

(taken from DOT Order 4200.14B)

1. **Major System Identification.**
 - a. Description of the mission need to be satisfied. (A copy of the approved mission need statement should be attached to the AP)
 - b. Name and brief description of the proposed acquisition program, including an explanation of how it will improve transportation.
 - c. A plan and budget for obtaining alternative system design concepts or a justification, with supporting details, if alternative design concepts are not to be solicited.
 - d. Identification of the key decision under consideration. Complete justification for waiving one or more key decision points should be included in this section of the AP.
2. **Recommendation.** Include a positive recommendation, i.e., we should proceed with the acquisition described in this AP because (rationale supporting the recommendation).
3. **Program/Project Plan.** This section of the AP should contain a summary of the applicable program planning documents and should cite the dates and other pertinent identifying data of each document. (Attach copies of the documents as appropriate). This section of the AP should also include:
 - a. Details of initial program activities, including preliminary research, and studies, leading up to the AP under consideration.
 - b. Summary of projected program activities through completion or implementation.
 - c. Status of prior and current systems that have a relationship to, but are not part of, the major system described in the AP. Include any known programs, projects, or systems which are, or have been directed toward similar objectives.
 - d. Acquisition cost estimates, by fiscal year, for each key decision phase. Indicate whether the estimate is in current year or 'then year' dollars, and what inflation factors were considered in the estimate.
 - e. Identification of the resources required from all sources, including in-house effort, contracts, grants and interagency agreements. Indicate the time and costs of in-house efforts separately from out-of-house efforts (contracts, grants, etc.).
 - f. Identification of Government or commercial facility needs which require special attention or approval.
 - g. Identification and evaluation of the major risks involved, including technical, budgetary and schedule, in achieving the goals of the proposed program.
 - h. An identification of any major operational cost, legal environmental, safety, procurement or logistical support requirements foreseen in the acquisition and proposed plans for satisfying these requirements.
 - i. Indicate the extent of consideration given to and any approval obtained or required relating to the requirements of DOT 1370.2A, Procurement of ADP Processing Equipment and Services.

4. **Acquisition Plan.** This section should include, as a minimum, a discussion of the following items:
 - a. Overall logistics strategy to put the system into operational use, including support requirements such as documentation, data collection, technical support services, spare parts, training, and maintenance, and installation.
 - b. Procurement strategy including a discussion of the following factors for the phase under consideration:
 - (1) Identification of all on-going and proposed contract efforts. This section should include a brief description of each contract award, estimated cost, period of performance, proposed method of procurement and contract type, anticipated award date, and contractor name (if known).
 - (2) Procurement schedule, milestones and performance objectives.
 - (3) A discussion of the consideration given to assuring competition and achieving an appropriate balance between contractor and Government risk.
 - (4) A discussion of the feasibility of attempting cost sharing or otherwise providing contractors with additional incentive to maximize accomplishment and cost control.
6. **Schedule Goals.** A projection of schedule goals for the program include procurement milestones including consideration of the impact on contractors of delay, if any, between program phases.
7. **Economic Analysis, Cost-benefit/Cost Effectiveness Analysis, and Life Cycle Costs.** Summarize the analyses previously undertaken and present a projection of life cycle costs for the program.
8. **Special Funding Arrangements.** Funds to be provided to, or received from, other Government or public agencies and private contractors (cost sharing, grants, etc.).
9. **Program Management.** Designation of a program manager, and identification of the roles and functions of all organizations, principal officials and key personnel within and outside of DOT who have direct responsibility for performance of any of the work or for participating in any of the decisions called for in the AP. A description of the proposed management control structure including personnel resources and skills required. A copy of the program manager's charter shall be attached to the initial AP.
10. **Alternative Acquisition Actions.** Briefly describe the alternative strategies (e.g. program delay, cancellation, etc.) considered by the Head of the Departmental element prior to submission of the AP.
11. **Technical Alternatives.** Briefly describe all known technical alternatives, and combinations thereof, that have been identified to date. This section should be very broad in scope at key decision one and should narrow in focus as the program progresses.
12. **Technical Addendum.** This addendum, normally one page, lists the quantifiable operational and technical (design) characteristics and the units or measure which best describe the transportation system, and which best reflect its expected value and effectiveness in performing intended missions. This data shall be updated at each major decision point to show the current estimates for the delineated characteristics with respect to earlier projections. Operational characteristics normally include reliability and maintainability goals (system or component mean-time between failure (MTBF) and mean-time to repair (MTTR)). Technical characteristics normally include those salient parameters which must be achieved for the program to meet its objectives. They include, but are not limited to factors such as size, speed, weight, performance envelope, etc.

13. Submission Procedures.

- a. Prepare 20 copies of the AP.
- b. Transmit these copies to the Executive Secretary using the following routing:

To: The Deputy Secretary

Through: TSARC (M-60), Executive Secretary

[Ref. 5: Attachment 3]

APPENDIX B
MAJOR SYSTEMS CANDIDATE MEMO

(taken from DOT Order 4200.14B)

Major System Acquisition Candidate: (Program Name)

1. Brief statement of the mission need to be satisfied.
2. Identification of required new capability. (this should be addressed in terms of functional capabilities desired and not in terms of hardware solutions).
3. Statement of benefit to the Government.
4. Status of existing capabilities.
5. Resource requirements. (including in-house resources, contracts, grants, interagency agreements, etc.)
6. Time constraints.
7. Status of current planning activities for the proposed program. (identify any contract dollars expended to date, if applicable)
8. Recommendation as to whether the program should be designated as a major system acquisition.

[Ref. 5: Attachment 1]

APPENDIX C

MISSION NEED STATEMENT

(taken from DOT Order 1400.14B)

- I. Mission
 - A. Mission Area. Identify the major transportation problem to be satisfied.
 - B. Mission Task. State the mission need in terms of functional capabilities desired and not in terms of equipment or other means which might satisfy the need.
- II. Existing and planned capabilities to Accomplish the Mission Task.
 - A. Briefly summarize the existing and planned capability and inherited assets to accomplish the mission.
 - B. Departmental elements as well as other Government agencies involved.
- III. Assessment (with quantification, whenever possible). Assess the need in one or more of the following terms.
 - A. Shortfalls in an existing capability.
 - B. Technological opportunity.
 - C. Physical obsolescence of equipment.
 - D. Cost savings opportunity, potential for life cycle cost savings, etc.
 - E. Other.
- IV. Constraints.
 - A. Value or worth of meeting the need.
 - B. Relationship to overall agency budget.
 - C. Relative priority within the mission area.
 - D. Logistics considerations.
 - E. Environmental considerations.
 - F. Time Constraints.
 - G. Maximum and minimum estimates of resources required.
 - H. Other.
- V. Impact of staying with the Present System.
 - A. Ability to fulfill the mission.
 - B. Cost of increasing quantity of existing equipment to a level that meets the capacity or capability needed.
 - C. Cost of maintaining equipment with low availability or cost of ownership.

[Ref. 5: Attachment 2]

APPENDIX D

PROGRAM MANAGER'S CHARTER OUTLINE

(taken from DOT Order 4200.14B)

- A. Introduction.**
 - 1. Purpose/Action Requested.
 - 2. Background.
 - 3. Approval.
- B. Charter.**
 - 1. System Description.
 - 2. Scope of Project.
 - 3. Authorities.
 - 4. Responsibilities.
 - 5. Operating Relationship.
 - 6. Supporting Organizations.
 - 7. Organization and Staffing (including organization chart).

[Ref. 5: Attachment 4]

APPENDIX E QUARTERLY STATUS REPORTS

(taken from DOT Order 4200.14B)

1. Program Title:
2. Report Period:
- *3. Overall Assessment of Status:
- *4. Evaluation of Technical Performance:
- *5. Evaluation of Schedule:
- *6. Evaluation of Cost:
 - * for item numbers 3-6 above the following status codes are applicable:
 - A - On target
 - B - Management Attention
 - C - Critical
 - (Status code definitions are in Appendix ____).
7. Major Achievements in Last Quarter:
8. Key Milestones
 - Met:
 - Missed:
9. Key Milestones in Next Two Quarters:
10. Financial Management Information.
11. Key Problem Areas (discuss potential impact and corrective action planned):
 - a) total program
 - b) prime contract
 - c) support contract(s)
 - d) interfaces with other systems or equipment
12. Meeting, Conferences, Program Reviews
 - Summarize key meetings for (1) the report quarter, indicating purpose, attendance and results; and (2) the next 2 quarters, indicating purpose and attendance.
13. Life Cycle Costs
 - Assess any events since the previous Quarterly Status Report which might significantly affect the life cycle costs.
14. Assessment of the estimate to complete the current program:
 - a) total program
 - b) prime contract(s)
15. Prime contract(s) changes

Number of contract changes approved in the current quarter __, Dollar amount _____.

Number of contract changes submitted in the current quarter but not approved _____.

Estimated dollar amount _____.

Submitted by: _____ Date _____
Program Manager

Approved by: _____ Date _____
Administrator

[Ref. 5: Attachment 6]

APPENDIX F STATUS CODE DEFINITIONS

(taken from DOT Order 4200.14B)

The following criteria provide more specific guidelines for identifying when a program is significantly off target.

On-target Status *

1. Not more than 10 percent off budget as reflected in the operating plan.
2. Within 3-4 weeks of meeting major nonpublic milestone dates (milestones to which the Secretary has not publicly committed the Department).
3. Making acceptable progress toward achieving objectives and performance measures, and indicating that this satisfactory performance will continue.

Management Attention Status **

1. Between 10-20 percent off budget as reflected in the operating plan.
2. Between 1-3 months of meeting major nonpublic milestone dates.
3. Results indicate program may not be able to achieve desired objective and performance measures.
4. Although current status is still on target, a situation is developing that will cause problems in the future.

Critical Status **

1. Over 20 percent off budget as reflected in the operating plan.
2. More than 3 months behind meeting major nonpublic milestone dates or behind any milestone to which the Secretary has publicly committed the Department.
3. Results to date show the program will not meet desired objectives and performance measures without budget or legislative relief.

* No action required.

** The Assistant Secretary for Budget and Program shall advise the Acquisition Executive as appropriate.

[Ref. 5: Attachment 6]

APPENDIX G

AGENCY PROCUREMENT REQUEST

(taken from FIRMR Sec. 201-23.106-2)

1. **Agency Information:** Provide agency name, address, and location where equipment will be installed or services will be performed. Provide names and telephone numbers of appropriate technical and contracting officials. Identify the position title and organization identity of the official authorized to conduct the acquisition.
2. **Project Title and Description:**
 - a. Provide the project title and a brief but specific description of the primary agency program(s) that the ADP equipment will support.
 - b. Provide a brief but specific description of the current major system components (including ADPE configuration) or services supporting the program(s).
 - c. Provide a brief but specific description of the major system components or services to be acquired during the systems life of the requirement. The delegation resulting from this submission will be limited to resources described herein.
3. **Acquisition Strategy:**
 - a. Indicate whether or not the proposed procurement approach is to satisfy a requirement using a specific make and model specification; whether compatibility limited requirements will be used on either a mandatory or nonmandatory basis; and specify the type of contract expected to be used.
 - b. Identify by fiscal year quarter the following planned milestones: Release of solicitation document and contract award.
 - c. If the request involves a pilot or prototype, the strategy for the follow on implementation phase must be described.
 - d. Indicate whether the acquisition plan contemplates contracting ... under policies and procedures for:
 - (1) Full and open competition
 - (2) Full and open competition after exclusion of sources; or
 - (3) Other than full and open competition.
4. **Estimated Contract Life and Cost:** The estimated contract cost of the acquisition (not the overall system life cost) shall be identified by type of request for the contract life and shall include all anticipated optional quantities, services, and periods... The estimated contract cost should correspond to the planned contract life. The delegation of authority resulting from this submission will be limited to quantities and years described herein.
5. **Regulatory compliance:**
 - a.
 - (1) Provide a statement which indicates that the agency has reviewed and complied (or will comply) with all applicable regulations, or
 - (2) List those deviations to the regulations that apply to this request for which approval is sought and provide an explanation for each regulatory deviation request.
 - b. Provide the date of completion or most recent update of the following documentation, or indicate if not applicable:
 - (1) Requirements analysis

- (2) Analysis of Alternatives
 - (3) Performance evaluation for the currently installed ADP system
 - (4) Findings to support the use of compatibility limited requirements
 - (5) Software conversion study
 - (6) Certified data to support a contemplated requirement available from only one responsible source
 - (7) Certified data to support a contemplated requirement using a specific make and model specification
 - (8) Description of those planned actions necessary to foster competition for subsequent procurements
6. **Agency remarks:** Provide additional information deemed necessary concerning any of the above items or special conditions associated with this procurement; e.g., required building construction modification by GSA.
7. **Agency/GSA references:** Provide references to previous GSA authorizations, meetings, telephone discussions, etc.
8. **Agency authorized signature, position title, organizational identity, date.**
- [Ref. 9: Section 201-23.106-2]

APPENDIX H

DETERMINATION OF NEED AND REQUIREMENTS ANALYSIS

(taken from *FIRMR Sec. 201-30.007*)

As a minimum, the agency shall consider the following factors in the requirements analysis:

1. The information processing functions that must be performed.
2. The agency applications, information resource systems, and components involved, their physical locations, and operational constraints.
3. The problem that will be solved by acquiring new or additional equipment, systems and/or software.
4. The nature of the data or information to be generated, transmitted, or stored on the proposed equipment or system, who will maintain it, and who will require access to it.
5. The feasibility of sharing, using reassigned or excess Government-owned or -leased equipment, the off-loading of lower priority applications, using Federal data processing centers and GSA sources of supply, using commercial ADP services, or if applicable, increasing the capability and productivity of the existing system.
6. The probable improvement in operational effectiveness and the economies that will be realized from acquiring new or additional equipment, systems, and/or software.
7. Space management considerations; e.g. heat dissipation, air flow, temperature range, relative humidity, energy conservation, power supply, cables, including coordination with building managers and GSA.
8. The present and projected workload in terms of:
 - i. Systems life;
 - ii. Data entry and associated telecommunications support;
 - iii. Data base and data base management;
 - iv. Data handling or transaction processing by type and volume;
 - v. Output needs and associated telecommunications support;
 - vi. Expandability requirements; and
 - vii. Privacy and security safeguards.
9. A performance evaluation of the currently installed ADP system to provide a baseline for evaluation of proposed alternatives for meeting the data processing needs.
10. The risks over the systems life of adverse impact on agency missions by acquiring insufficient ADPE capacity versus the extra costs of acquiring excessive ADPE capacity.
11. The appropriate performance and capability validation techniques that should be employed in the acquisition.

[Ref. 9: Section 201-30.007]

APPENDIX I

COMPATIBILITY LIMITED REQUIREMENTS

(taken from FIRMR Sec. 201-30.009-3)

The following factors shall be considered in determining whether the incorporation of compatibility limited requirements is justified for the augmentation or replacement acquisition:

1. The essentiality of existing software, without redesign, to meet agency critical mission needs; e.g., the continuity of operations may be so critical that conversion is not a viable alternative.
2. The additional risk associated with conversion if compatibility limited requirements are not used and the extent to which the Government would be injured, financially or otherwise, if the conversion to the new ADP system fails.
3. The additional adverse impact of factors such as delay, lost economic opportunity, and less than optimum utilization of skilled professionals if compatibility limited requirements are not used.
4. The steps being taken to foster competitive procedures in the augmentation or replacement acquisition.
5. The off-loading of selected applications programs to commercial data processing service facilities as an alternative to conversion.
6. The continuation of ADP services for selected application programs with the present commercial ADP services contractor as an alternative to conversion of all programs in the present ADP resource system.
7. The extent of essential parallel operations; i.e., the need to continue operation of the old system in parallel with the new system until the new system can fully support the mission needs.
8. The feasibility of competing conversion requirements to be performed on a guaranteed basis under a solicitation that couples the conversion effort and ADP services in a single contract, including consideration of the basis for a calculation of liquidated-damages provisions for conversion performance failure.

[Ref. 9: Section 201-30.009-3]

APPENDIX J SELECTION PLAN

(taken from DOT Order 4200.11A)

The Selection Plan should include the following:

- a. A brief description of the product or service to be procured;
- b. The date of approval of an applicable Acquisition Paper covering the proposed procurement;
- c. Identification of any closely related procurements or planned procurements;
- d. A brief description of those areas of the procurement which are believed to represent significant technical, schedule, or cost risks;
- e. Nominations for staffing of the SEB by individual name. Indicate each nominee's field of specialization and job title. Ensure each nominee will be available to serve on the SEB before submitting the Selection Plan;
- f. An estimate of the total procurement cost and a statement of availability of funds;
- g. A statement of significant procurement considerations, including the proposed contract type, identification of option items, anticipated period of performance, funding method, and and unusual contract clauses that are contemplated;
- h. Identification if the product or service to be procured will be the basis for future standardization;
- i. A proposed milestone schedule of events leading up to contract award; and
- j. Any other information warranting the SSO's attention.

[Ref. 11: pp. 1-1,2]

APPENDIX K

REQUEST FOR PROPOSAL

(taken from DOT Order 4200.11A)

In determining the RFP's acceptability, for evaluation purposes, the SEB should assure that it provides the following:

- a. A statement of work accurately describing the product or service to be procured. Further, the statement of work should be consistent with the approved Selection Plan and any applicable Acquisition Paper. If the acquisition is a major system subject to the requirements of DOT 4200.11-A and the approved AP provides for the solicitation of alternative system design concepts, the Government's requirement should be stated in terms of mission need so that industry can respond with alternative system design concepts to satisfy the mission need and propose their own technical approach, design features, subsystems, and schedule and cost goals.
- b. A statement as to whether or not a pre-proposal conference is contemplated. If a pre-proposal conference is to be held, state when and where and advise the offerers that questions to be discussed at the conference must be submitted in writing by a specified number of days prior to the conference. Sufficient time must be permitted for potential offerers to review the RFP prior to any pre-proposal conference.
- c. Description of the desired proposal format.
- d. Description of the type of contract that is contemplated, i.e., cost reimbursement or fixed price, and any special incentive or cost participation features. The RFP should include a notice that although a particular type of contract is contemplated, the Government may determine after evaluation of proposals, that another type of contract is more appropriate and may award on that basis without soliciting new proposals from all offerers.
- e. Clear and concise statement of the basis on which the award will be made. This should be followed by:
 - (1) Complete description of the technical evaluation criteria. The technical evaluation criteria should be listed in descending order of importance with an indication, in some narrative manner, of their relative importance.
 - (2) Description of the business management evaluation criteria.
 - (3) Description of any other evaluation criteria established by the SEB, e.g. cost.
- f. When appropriate, state the number of awards contemplated or that multiple awards may be made.
- g. Proposed contract clauses.

[Ref. 11: pp. IV-1.2]

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